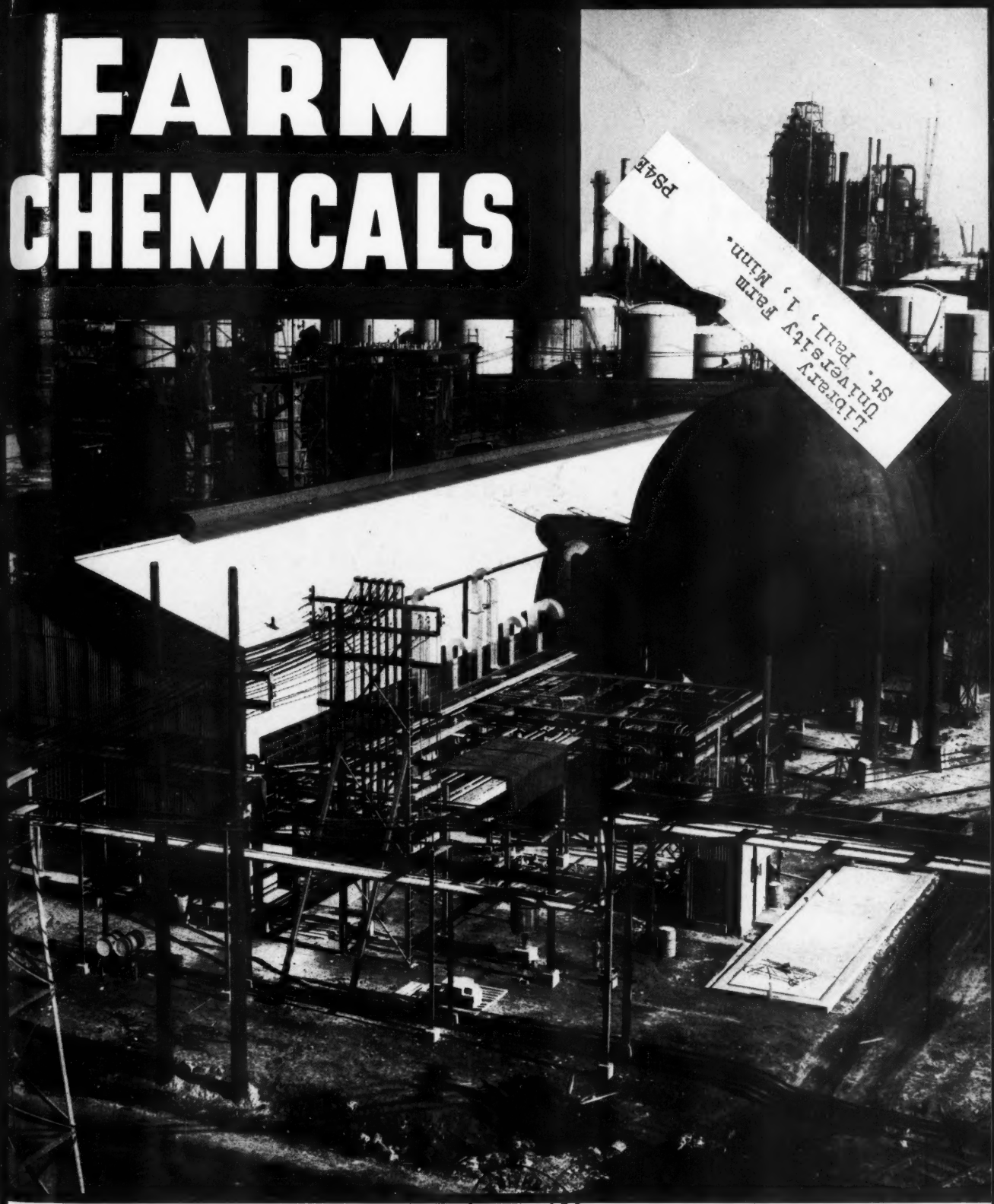
FARM CHEMICALS



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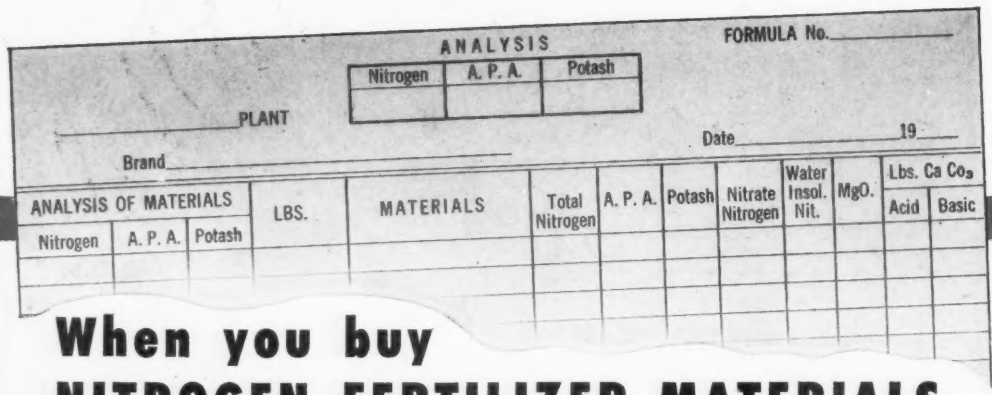

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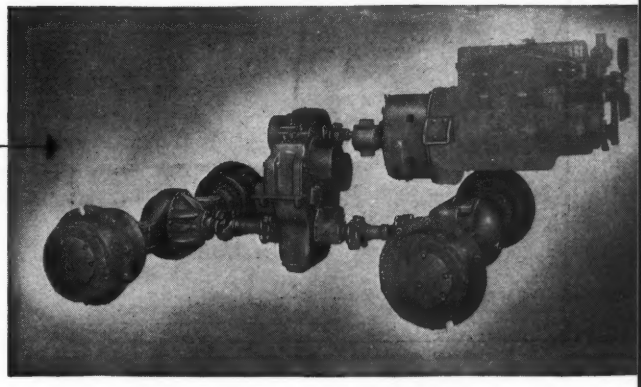

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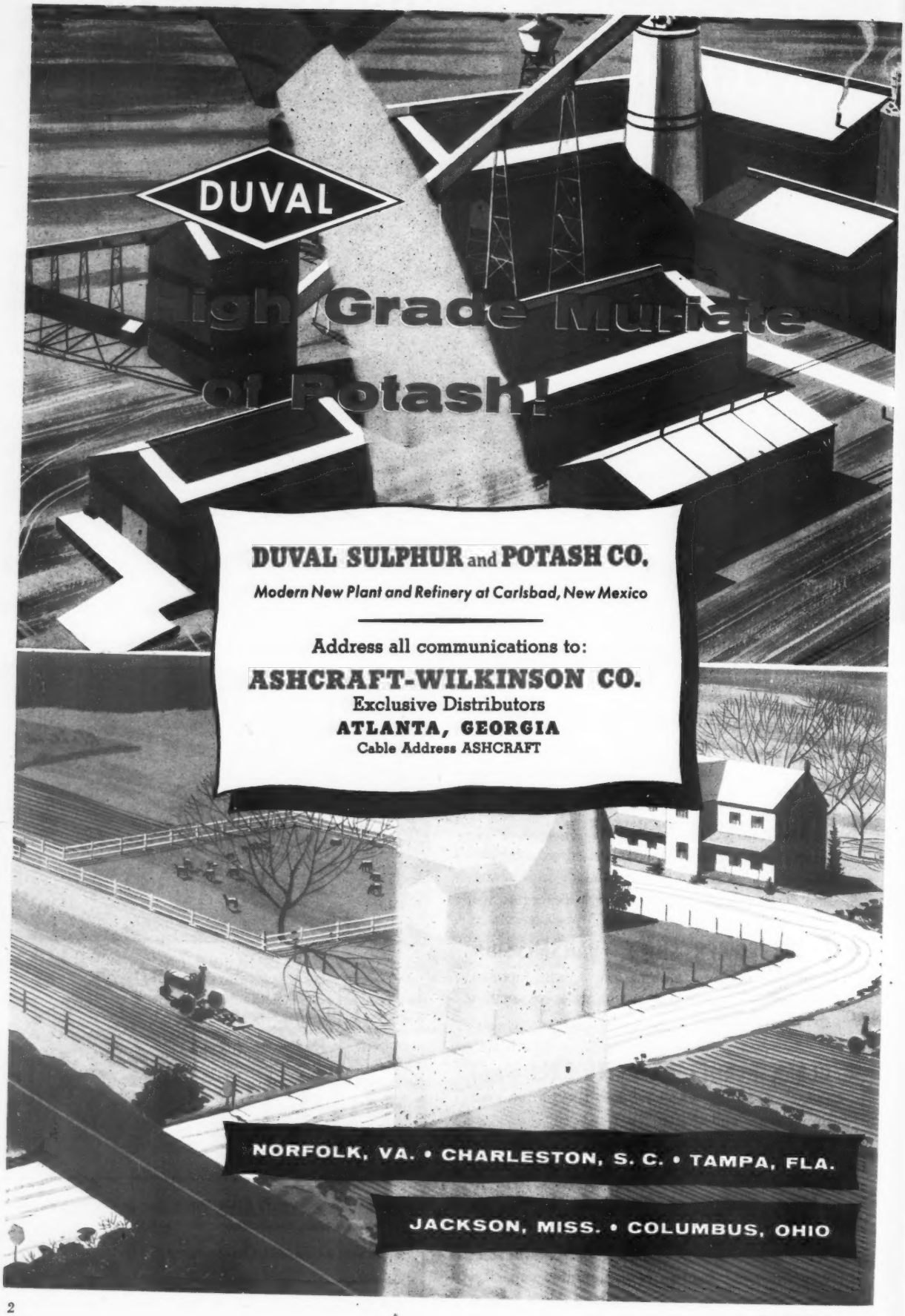
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Pioneer Journal of the Farm Chemicals Industry – Established 1894

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Vol. 117 OCTOBER, 1954 No. 10

Cover Story

About 40% of the daily 100 tons of ammonia to be turned out by Atlantic Refining's new Philadelphia plant will be sold for agricultural purposes. The unit operates on by-product hydrogen from Atlantic's nearby petroleum refinery.

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In this issue . . .

Complete coverage of the fine program enjoyed by all at NAC's Spring Lake meeting begins on page 21. You will find, in addition to the usual summary of activities and photos of those attending the gathering, edited versions of the papers presented by Messrs. Price, Jeter, Hitchner, Conner, Goodrich, Coyne, Noone, Jester and Dunegan. This includes both the Miller Bill panel and the miracle drug discussion that attracted special interest.

A plentiful supply of statistical information was received during the past month and we include in this issue data on the 1954–55 fertilizer situation (page 37); a summary of 1954 phosphate rock statistics (page 42) and a report on potash salt deliveries (page 54.)

Those fortunate enough to attend the Chicago meeting of National Safety Council's Fertilizer section will find a number of interesting features. Included are excellent speakers and two of Tom Clarke's "Stump the Experts" sessions. See page 46.

Once again agricultural control officials converge on Washington's Shoreham hotel for their annual meetings. See page 41 for a brief article on the scheduled activities of the fertilizer and pesticide control groups.

K. D. Jacob, in a talk delivered at Gainesville, Fla., discussed fertilizer pesticide mixtures and the increased interest now evident in such preparations. A summary of his remarks is on page 45.

We didn't have room for summaries of all the papers presented to the Fertilizer & Soil Chemistry and Ag & Food Chemistry divisions of ACS at the recent New York City meeting. However, beginning on page 48 are some abstracts of widespread interest.

INDUSTRY News

Former USI Personnel Head Fairfield Chemical

Food Machinery & Chemical corp. has announced that management of its Fairfield Chemical div., which began operations Sept. 1, will be under the direction of personnel previously associated with the Insecticide division of U. S. Industrial Chemicals.

R. B. Stoddard, who served as coordinator of USI insecticide operations, is manager of the division, with offices at 420 Lexington ave., New York City. W. S Blondheim, plant manager of the Fairfield plant, will be in charge of operations other than sales and research and Dr. Herman Wachs has been named director of research, with headquarters in the Baltimore laboratories.

Dr. Walter E. Dove, director of entomological research, and Howard Jones, director of USI laboratories, have also been retained by Fairfield Chemical div., as well as John A. Rodda, sales manager for Fairfield.

Superphosphate Institute Formed

P_2O_5 finally comes into its own in the trade association field with the announcement that an American Superphosphate Institute, Inc. was formed last June. Headquartered in Washington, D. C., the institute is composed of superphosphate manufacturers.

President and treasurer of the group is Howard W. Doerr, known to the industry as a former USDA administrative officer and member of the Agricultural Chemicals div., OPS. Frank R. Dulany, president of Southern States Phosphate & Fertilizer co., has been named vice president and Charles Ellis, Jr., president, Mutual Fertilizer co., is the first secretary.

Basic objectives of the new institute as outlined by Doerr are to "develop, encourage, increase and extend the utilization of superphosphate in the interest and aid of sound agriculture."

The association is located in Suite 823A, 1028 Connecticut Ave., Washington 6. Telephone number: MEtropolitan 8-2161.

Begin Iowa Fertilizer Plant

Construction was begun early in September on a fertilizer plant for Spencer Plant Foods at Spencer, Ia. This newest Midwest plant food facility will have an annual capacity of 25,000 tons.

Owners of the concern include local business men and some officials of the Blue Valley Fertilizer co. of Marysville, Kan. Fred Sherer of Coloridge, Neb., is president.

Operations are scheduled to begin on Nov. 1 with distribution slated for western Iowa and parts of Minnesota, South Dakota and Nebraska. Engineering and all machinery is being furnished by Blue Valley Equipt. Mfg. & Eng. co.

Hegeler Zinc to Nat'l. Distillers

National Distillers Products corp. has acquired The Hegeler Zinc co. of Danville, Ill., through exchange of stock, according to an announcement by J. E. Bierwirth, National Distillers president.

National's chief interest lies in Hegeler's sulfuric acid plant, which it intends to expand. The present Hegeler plant, which produces 77 per cent sulfuric acid, will be integrated with the existing plants of the USI division in Tuscola, Ill.; Dubuque, Ia. and De Soto, Kan., which are producing more than 900 tons of sulfuric acid a day.

The company strongly emphasized that its policy is to produce raw materials for the fertilizer industry—not to produce finished fertilizer for resale.

Farmers Union Potash Plans

National Farmers Union, Denver, Colo., has announced plans for construction of a $10 million potash plant in the Carlsbad, N. M., area. C. E. Huff, general manager, said that the project is part of a $25 million expansion program planned over the next six to eight years and that enlargement of activity in the farm chemicals industry will be a part of the program.

Farmers Union industrial members will consume most of the output of the plant, which is expected to go into production in about three years.

Huff said that FU has been conducting drilling operations in the Carlsbad area for about three years.

Fortier Sales Unit Formed

American Cyanamid co. has formed a Petrochemicals dept. sales organization to handle most of the products of its Fortier plant. To be headed by Dr. V. E. Wellman, manager of the Petrochemicals dept., the sales group will handle sales and sales development of acrylonitrile and certain other industrial chemicals made at the Fortier plant.

Assistant sales manager is Dr. A. J. Weith; district sales manager, to be located in New York, George C. Voss and district sales manager in Chicago, Frank W. Miner. The New York office is now in operation, and the Chicago office is expected to be opened by the end of the year.

New General Chem. Lab

A new research laboratory has been dedicated by Allied Chemical & Dye corp. for its General Chemical div. in Morris Township, N. J., adjacent to the company's central research lab.

Members of the laboratory supervisory staff conducted guests on tours of the $2 million facility, reported to be one of the most extensive and completely equipped industrial research labs in the New York area.

More than 55,000 square feet of floor space is provided for research activities in the three-story L-shaped building, which replaces the division's Laurel Hill, L. I., N. Y., laboratory. It will permit General Chemical to expand and intensify its research program in industrial, scientific and farm chemical fields.

Standard Oil to Build Ohio Petrochemical Plant

About $17 million will be invested by Standard Oil co. in a petrochemical manufacturing plant to be located in the Toledo-Lima, O., area, according to an announcement by Clyde T. Foster, president.

Construction of the plant, which will produce anhydrous ammonia, urea, nitrogen solutions and nitric acid, was expected to start in September and is scheduled for completion early in the fourth quarter of 1955. The Sohio plant will have a daily production capacity of 300 tons of NH_3, of which almost 200 tons per day will be used in additional processing to make about 125 tons of urea, 60 tons of nitric acid and over 200 tons of nitrogen solutions per day. The M. W. Kellogg co. will construct the anhydrous ammonia plant.

Add 2,4-D Facilities to Thompson-Hayward Plant

An addition, consisting of a new warehouse adjoining present 2,4-D manufacturing and formulations facilities, will be built by Thompson-Hayward Chemical co., at its new plant in Kansas City, Kans.

It is expected that construction will be completed by early December. This addition will provide for adequate manufacturing and warehouse facilities to meet the growing demand for the company's 2,4-D and related weed and brush killer products.

TVA to Stress High Analysis

TVA has announced that its fertilizer research facilities will be devoted to the introduction of less well accepted high analysis plant foods when it discontinues production of concentrated superphosphates in 1955, as previously reported.

Production of calcium metaphosphate containing about 62 per cent available phosphate will be continued and experiments will be conducted with nitrogen phosphate mixtures of varying analyses, including diammonium phosphate and other products.

Name S. E. Jones to Head Pink Bol.worm Laboratory

Dr. Sloan E. Jones, entomologist and administrator of Clint, Tex., has been named as head of the USDA's pink bollworm research laboratory at Brownsville, Tex. Appointed to this post on Sept. 1 by E. F. Knipling, chief of the department's Entomology Research branch, Dr. Jones leaves a position as branch manager and consultant for a farm chemicals company in the Southwest. A. J. Chapman, a USDA entomologist, will be assistant head of the laboratory.

Jones will be responsible for all USDA pink bollworm research at the Brownsville laboratory, and also will serve as understudy to Dr. F. C. Bishopp, who is coordinator of the over-all state-Federal-industry research program.

Fernald V-C Plant Operating

Full scale production has been attained at the Fernald, O., plant of Virginia-Carolina Chem. corp., where all grades of phosphoric acids and sodium tripolyphosphates and tetrasodium pyrophosphates are being turned out. The million dollar operation is under the supervision of Frank R. Keeshan, superintendent, and his assistant G. Morrissette.

Tailings

Rumor and speculation once again about the possible merger of APFC and NFA. To date no one is confirming or denying.

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Cornwall Chemical corp., Cornwells Heights, Pa., was the subject of a brief story in the daily Philadelphia Inquirer. Organized in 1946 by former General Chem. div. general manager, Mark Bradley, the firm has expanded rapidly—just completed a program which boosted H^2SO_4 capacity by 150 per cent.

◆◆◆◆

Some unfavorable reactions resulted from use of herbicides along North Carolina telephone right-of-ways by Southern Bell Telephone and Telegraph. N. C. manager for Bell, C. L. Lott, writes that the "Garden Club of North Carolina and a number of influential newspapers have criticized the 'scorched earth' appearance." Lott says the company has found a mixture of fuel oil, 2,4-D and 2,4,5-T in water effective and is "pleased with the results obtained."

◆◆◆◆

FARM MANAGEMENT *for September presents the "Big Ten" in Western insect pests and includes on the worst enemy list the grasshopper, lygus bug, beet leafhopper, alfalfa weevil, mosquito, housefly, codling moth, two spotted spider mite, corn earworm and the aphid.*

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West Coast experiments, according to California Fert. Assn., show that high fertilization rates reduced the costs of producing one ton of sugar beets by 34 per cent.

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Al Anderson, Alaska Development Board, in response to a query from FARM CHEMICALS confirms rumors of the possibility of an ammonium nitrate plant being constructed in Alaska, a unit similar to the one recently completed in Iceland. Several sites are available where 20,000 kilowatts could be generated at less than five mills, says Anderson, and nearby deposits of limestone would permit combined shipments to avoid explosives tag.

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As a service to a subscriber of long standing we report that Jacques Lonel is looking for a position outside France and would be especially pleased to hear from US phosphate producers. Lonel is a mining engineer, ACSM, and an associate member of IMM (London) formerly of Lonel & Co. and "left without employment by Mr. LeCornes of French North African Phosphates." Address: Monsieur Jacques Lonel, aux bons soins de Madame Puis, 67 rue La Fontaine, Paris (XVI°), France.

◆◆◆◆

TVA is to exhibit at the Chicago Chemical Exposition a panel display of a new process for utilizing leached zone materials from Florida phosphate lands for fertilizer and uranium production. Now in pilot plant stage, the process is a cooperative TVA—AEC venture and has tremendous potential.

Awards to Royster Supts.

E. O. Burroughs, Jr., Insurance dept. mgr.; Superintendents Moss, Lacy and Hall and Vice Pres. F. S. Moore.

Three F. S. Royster Guano co. superintendents were presented special awards in recognition of the outstanding safety records of their plants.

The Atlanta, Ga., factory has operated five years and 173,803 man hours without a lost time accident; Macon, Ga., plant operated from Jan. 29, 1952 to July 9, 1954 and 350,000 manhours without a lost time accident and the Baltimore, Md., plant completed 365,015 manhours from May 23, 1952 to Oct. 28, 1953 with no lost time accidents.

J. E. Moss is superintendent of the Atlanta, Ga., plant, E. N. Lacy, the Baltimore plant and E. A. Hall, the Macon, Ga., plant.

NCI Meeting Held

Two new vice presidents were elected by Northern Chemical Industries at its 10th annual meeting at Searsport, Me.; Dr. C. LeRoy Carpenter, present director of research and formerly with Grace Chemical co., and James C. Totman, now manager of the Bangor office of Summers Fertilizer co. Totman is also assistant treasurer and director of Summers. Present officers were reelected.

Dividends of $3 per share on class A common stock and $3.50 per share on class B stock were declared by directors.

President J. E. Totman stated that favorable progress was being made toward enlarging the Searsport facilities. Contemplated expansion for which a government Certificate of Necessity has been issued covers a 120 ton per day anhydrous ammonia plant, as well as nitric acid, nitrogen solutions and nitraphosphatic facilities. Stockholders voted to increase authorized B stock issue to 250,000 shares, with present holders receiving 10 shares of new for one of old, in anticipation of the expansion.

Seek Volatile Fungicide

Researchers at the University of California's Citrus Experiment Station are reported to have already waded through screening of 520 volatile chemicals in the search for a fungicide sufficiently volatile to protect citrus fruit in transit and storage. Drs. R. J. Klotz and C. N. Roistacher are carrying out the experiments.

It has been found, in experimental tests, that vapors from small, regulated concentrations of several aldehydes and alkyl dithiocarbamates, ammonium and organic sulfide materials, were effective in inhibiting the rate of decay and greatly reducing losses in injured and inoculated oranges and lemons. Work is now underway to adapt these methods to commercial practice.

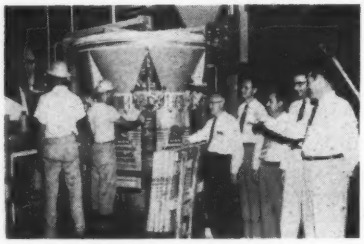
USDA's Harned Retires

Robey W. Harned, one of the founders of professional entomology in the South and a leader in cotton insect research, has retired from the USDA. He directed cotton insect work for the department's Bureau of Entomology and Plant Quarantine for more than 20 years. Since the USDA reorganization last fall he has been acting as consultant and staff assistant to the chief of the Entomology Research branch, Agricultural Research Service.

Fertilizer Use Handbook

"Fertilizer Use and Crop Response," Agricultural Handbook No. 68, is expected to be off the press soon. Bringing together in one volume revised information assembled by the National Soil and Fertilizer Research committee, it supersedes the five reports published July, 1951, showing how crop yields respond to additional increments of the primary plant foods.

Ammonium Nitrate from Lion Oil's Barton Plant



Initial bags of ammonium nitrate move from the packing line at Lion Oil co's new Barton plant at Luling, La., as representatives of the company and Fulton Bag & Cotton Mills look on. Shown from left to right are R. L. Van Zandt, Lion's Barton superintendent; Jason M. Elsas, Fulton vice-president; Louis J. Even, Fulton New Orleans sales supervisor; Wm. G. East, Barton purchasing agent and J. Frank Greeley, Fulton's multiwall paper bag division manager.

Olin Mathieson Officials Elected

Officers have been elected by Olin Mathieson Chemical corp., which officially was formed on Aug. 31 from Olin Industries, Inc. and Mathieson Chemical corp.

John M. Olin, president of Olin Industries, is chairman of the new company and Thomas S. Nichols, Mathieson president, is president of Olin Mathieson.

John W. Hanes is chairman of the Finance committee and vice president for finance, and executive vice presidents are F. Stillman Elfred, John C. Leppart and Stanley de J. Osborne.

Vice presidents of the new organization include Russell R. Casteel; Norman H. Collisson, Donald W. Drummond, R. L. Hockley, Milton F. Meissner, S. L. Nevins and J. J. Toohy—operations; Russell Hopkinson—development; Robert W. Lea—organization; R. B. Lewis—financial analysis; Walter F. O'Connell, vice president and assistant to vice president for finance; David T. Marvel—sales; Fred Olson—research; Ralph A. Ostberg—production and Theodore Weicker, Jr.—overseas operations.

Edgar W. Taft is treasurer; C. C. Tallman, comptroller; Gordon Grand, Jr., secretary; E. R. Van Vliet, assistant treasurer and A. P. Winsor, assistant secretary.

All officers elected were formerly associated with the predecessor companies.

Oklahoma NH_3 Center

Monarch Fertilizer co., Muskogee, Okla., will build a $100,000, 90,000-gallon capacity anhydrous ammonia distribution center on a five acre tract near the plant of Grand River Chemical div., Deere & co. in the Pryor industrial area southeast of the city.

The new center will consist of three 30,000-gallon capacity high-pressure storage tanks, an office building and scales.

Ammonia will be transported to the tanks by rail, and then transferred to mobile units, which will have a capacity of 8,000 gallons each, for distribution to smaller centers at various towns throughout Oklahoma and Kansas.

The ammonia storage tanks and the mobile units, which are being manufactured by Creamer and Dunlap, were expected to be completed and in operation by Oct. 1.

Monarch officers include R. M. Mountcastle, president of the board; K. A. Schmitt, pres. and general manager; W. H. Gilder, Sr., vice president and W. H. Gilder, Jr., secretary-treasurer.

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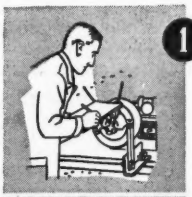
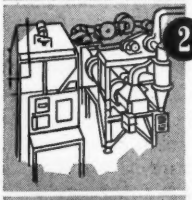
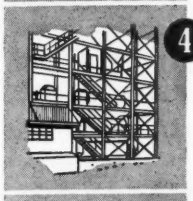


1 **MODERN LABORATORIES** have both miniature and full-scale facilities—offer free testing service on a few pounds or full carloads of your material. Link-Belt will also lease equipment for work in your plant.



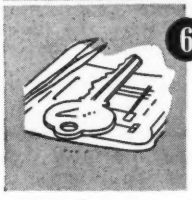
2 **PILOT PLANT** and testing station, operated in cooperation with a leading university, continually works to find new ways to improve commercial fertilizer ... adapt laboratory procedures to plant conditions.

3 **ENGINEERING** based on broad, practical experience, assures better equipment that often permits use of lower cost ingredients. Other developments have reduced processing time, saved storage space.

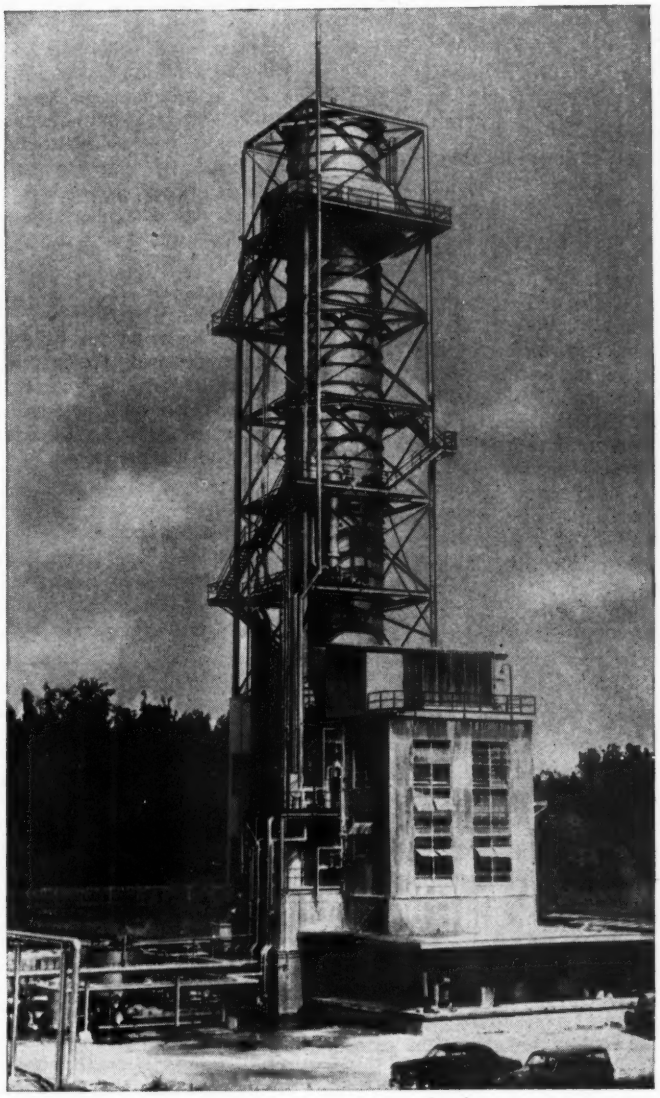


4 **LINK-BELT EQUIPMENT** includes dryers, coolers, granulating drums, disintegrators, continuous mixers, ammoniators, roll crushers, all types of conveyors & elevators, vibrating screens, all types of chains & power transmission machinery.

5 **SKILLED ERECTION CREWS** When you rely on Link-Belt as a single source, Link-Belt accepts responsibility for placing your plant in full operating readiness. We will also supervise modernizing existing plants.



6 **SATISFACTORY PERFORMANCE** can be furnished by Link-Belt. Link-Belt experience includes dry-mix, superphosphate, nitrophosphate, ammonium nitrate, ammonium sulphate, urea, granulation and other plants.



In this southern ammonium nitrate plant, Link-Belt supplied conveying, drying, cooling, mixing, elevating and screening equipment for a fully integrated system.

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Pesticide Consumption Increasing in Nicaragua

Nicaraguan pesticide consumption is expected to increase 50 per cent in the 1954–55 season, according to a report from the Bureau of Foreign Commerce.

Consumption in 1954–55 is estimated at: BHC (14 per cent), 404,500 pounds; DDT (100 per cent), 340,000 pounds; DDT (75 per cent wettable), 250,000 pounds; toxaphene, 160,000 pounds; aldrin (60 per cent), 8,000 pounds; dieldrin (100 per cent), 5,300 pounds; parathion (25 per cent), 2,500 pounds; sulfur, 120,000 pounds; 2,4-D, 1,800 gallons.

The bureau reports that consumption may quadruple by 1960 and also points out that pesticides are considered essential import items with foreign exchange available for payment.

Importation has been facilitated by an executive decree permitting importation in bond provided payment of merchandise has been agreed upon on credit terms of not less than 180 days from date of embarkation. However some US exporters refuse to grant the six months credit terms which are met by European concerns.

Although the quality of US pesticides is considered equal if not better than that of European products, lower prices and better terms have favored European imports. Local importers also feel that more interest could be shown by US suppliers in advertising and point out that to be of any value literature must be in Spanish.

NFA-ASHS Publish Home Garden Book

A new book, "The Care and Feeding of Garden Plants" has been published jointly by the National Fertilizer Association and the American Society for Horticultural Science.

Prepared for the homemaker, the cloth-bound book contains more than 300 pages of text and illustrations, including 37 pages of color drawn from actual plant food starved plants.

The book is available in this country for $3 from NFA, 616 Investment Building, Washington 5, D. C. Price to NFA members is $1.80.

McCall Units Purchased

Nine anhydrous ammonia distributing companies have been acquired by Chemical Enterprises, Inc., of New York City, from W. C. McCall of Portland, Ore., according to a recent announcement. The companies are McCall Chemical co.; McCall Farm Chemicals of Oregon, Inc.; of Pendleton, Inc.; of Umatilla county, Inc.; McCall Farm Chemicals, Inc.; McCall and Huntington Farm Chemicals, Inc.; McCall Farm Chemicals of Idaho, Inc.; of Moscow, Inc. and of Lewis County, Inc.

W. C. McCall will continue as a director and as president of these companies. Daniel B. Curll, Jr., C-E president; J. C. Berry, Louisiana Liquid Fertilizer Co. president; C. L. Cummings of Pendleton, Ore., and J. O. Huntington of Walla Walla, Wash., have been elected directors.

Begin Kansas Acid Unit

Start-up of a 300-ton-per-day sulfuric acid unit at the Galena, Kans., plant of Eagle-Picher co. has been announced by Monsanto Chemical co., designers of the facility. Sulfur dioxide gas produced by the roasting of zinc ores is utilized. The gas is converted by the contact process to sulfur trioxide, which is absorbed to give sulfuric acid.

DuPont Process for Girdler

The Girdler co. will build nitric acid plants employing the process of E. I. duPont de Nemours & co. for the chemical, fertilizer and explosives industry, announced W. R. Wood, Girdler's executive vice president.

Another Brea Terminal

Construction work was expected to be completed Sept. 1, on a 90,000-gallon Brea Aqua Ammonia distribution terminal and conversion terminal at Malin, Ore.,

New Plant in Monsanto Phosphate Expansion

Major expansion of facilities for production of phosphate salts and phosphoric acid, including an entirely new plant to be located at Kearny, N. J., is planned by Monsanto Chemical co.,

Initial facilities, which are expected to be ready for production by early 1955, will include a unit for the conversion of elemental phosphorus into phosphoric acid and a plant for production of sodium tripolyphosphate.

In addition to the New Jersey location, the expansion involved added facilities in existing plants at Trenton, Mich., St. Louis, Monsanto, Ill., and Long Beach, Calif. Construction of some of the units is already under way, and other work will start immediately.

AP&C Packages Redesigned

The redesigning of packages for American Potash & Chemical corp. products has been completed for the company's entire line of 21 products. This marks the first basic change in packaging AP&C products in 35 years.

Purpose of the program, to obtain a package design that combined an efficient listing of contents with sales appeal, was achieved by planning one basic pattern for all packages. In addition, products were grouped in two classifications which were assigned either forest green or navy blue for their package color to aid in identification.

APFC Host for Ag Editors Tour

Editors at Delta Branch Exp. Station. In foreground are Dr. W. L. Giles, station supt., and Dean Clay Lyle.

Dr. W. E. Colwell, North Carolina State College, (ext. rt.) illustrates a point in his talk to the editors.

Editors of 17 of the nation's leading farm magazines were guests of the American Plant Food Council on a four-state tour of selected land-grant colleges on Aug. 16–21.

Traveling in a chartered DC-3 plane, the editors visited the University of Wisconsin, Madison; Delta Branch Experiment Station, Stoneville, Miss.; North Carolina State College, Raleigh and Rutgers University, New Brunswick, N. J., hearing lectures and receiving general information on latest developments and progress in the field of agricultural research and sound land management.

Guests included Al Bull, WALLACES' FARMER AND IOWA HOMESTEAD; Ferdie Deering, THE FARMER-STOCKMAN; Carl Deitemeyer, THE NEBRASKA FARMER; M. C. Gilpin, PENNSYLVANIA FARMER; Milon Grinnell, MICHIGAN FARMER; Delmer Groves, THE OHIO FARMER; W. D. Inman, CAPPER'S FARMER; W. H. Kircher, THE FARMER; W. C. Lassetter, THE PROGRESSIVE FARMER; C. L. Mast, Jr., AGRICULTURAL LEADERS' DIGEST; Eugene C. Meyer, HOARD'S DAIRYMAN; L. R. Neel, FARM AND RANCH—SOUTHERN AGRICULTURIST; Jim Roe, SUCCESSFUL FARMING; Paul D. Sanders, THE SOUTHERN PLANTER; Lee Schwanz, COUNTRY GENTLEMAN (BETTER FARMING); James C. Thomson, PRAIRIE FARMER and Ralph D. Wennblom, FARM JOURNAL.

People

Two new departments—a Research Service dept. and a Basic Research dept.—have been created within **American Cyanamid co.'s** Research div. and will be located at Stamford, Conn. Dr. R. H. Kienle has been appointed director of Research Service dept. and Dr. R. P. Chapman, assistant director. Dr. J. J. Salley has been appointed assistant director of the Basic Research dept. and Dr. J. T. Thurston, director of the Stamford laboratories, will be acting director of the latter unit.

Dr. J. C. Pullman has been named manager of technical service for **American Cyanamid co.'s** Petrochemicals dept. He had been assistant to the manager of the New Product Development dept.

Knowles

Arkell & Smiths has appointed Harry V. Knowles assistant to the sales manager of its Flexible Packaging div. The division was established recently to handle the output of the bag manufacturing plant the company recently acquired at Hudson Falls, N. Y.

Two changes have been announced in the sales staff of **Atlas Powder co.'s** Chemicals dept. Arthur G. Heinel, formerly in charge of the Atlanta office, has been appointed technical representative in charge of a new sub-office in Richmond, Va. He was succeeded in Atlanta by Adrian J. Stewart. Heinel will represent Atlas in Virginia, Washington, D. C., the eastern half of West Virginia and North Carolina.

Harrison Hale has been named manager of **Barada & Page's** Houston, Tex., branch. Warren L. Schulz replaces Hale as New Orleans branch manager.

New manager of sales promotion for **Blaw-Knox co.'s** Chemical Plant div. is Marvin M. Ramer, according to an announcement by E. W. Forker, vice president-general manager of the division.

Two new offices to serve eight southern states have been opened by **Bradley & Baker** in Atlanta and Norfolk. The Atlanta office, at 1401 Peachtree st., N.E., which will be headed by Richard R. Mehrhof, will service South Carolina, Georgia, Florida, Alabama and Tennessee. Clarence J. Ball will manage the Norfolk office, located in the Royster Building. Territory to be covered includes North Carolina, Virginia and Maryland.

Mehrhof

Ball

Carl G. Morrison has been named director of the Chemicals and Rubber div. of the **Business and Defense Services Administration,** succeeding Harold H. Smith who has returned to Dow Chemical co. Morrison is on loan from Enjay co., Inc., New York.

Carbide & Carbon Chemicals co. changes in Industrial Sales personnel: R. L. Duncan appointed Eastern div. sales manager with headquarters in New York; J. B. Harlow, district sales manager, Detroit, and G. E. Bernard, district sales manager, Atlanta.

Dr. D. M. Yoder has been named head of the Biological Research dept. of **Carbide and Carbon Chemicals co.** Formerly senior research fellow on Carbide's agricultural research fellowship at Boyce Thompson Institute for Plant Research Inc., he now will be responsible for the research work on Crag agricultural chemicals.

New member of **Commercial Solvents** Agricultural Chemical Sales dept. is M. K. McConnell. From CSC's offices at Sterlington, La., he will handle the sale and distribution of CSC ammonium nitrate to the fertilizer trade in Louisiana, Mississippi, Arkansas and Texas.

George Rieger has been named by **Diamond Alkali co.** to lead and coordinate market research activities of its recently formed Commercial Development dept. Rieger goes to Diamond from Hercules Powder co., where he has been assistant manager of its Sales Research div.

Harold H. Smith, following completion of his assignment as director of the Chemical and Rubber div., Business & Defense Services Administration, was appointed to the staff of Dr. Mark E. Putman, executive vice president, **Dow Chemical co.**

Died: Dr. Harry F. Dietz, 64, nationally known authority on control of insects, weeds and plant diseases, on Sept. 4 of a heart attack at his home on Burnt Mill Road, Chadds Ford, Pa. He had been employed by **DuPont co.'s** Grasselli Chemicals dept. since 1932, and since 1949 had been manager of the Agricultural Chemicals section of Grasselli's Technical div. Before joining DuPont Dr. Dietz had worked on agricultural pest control for 20 years with state and Federal agencies.

Fletcher L. Munger, western sales manager for **Gilman Paper co.,** has been named assistant to the vice president in charge of sales, with headquarters at 630 Fifth Ave., New York City. He will continue to supervise activities of the Chicago office until a replacement is announced.

Died: Adrian D. Joyce, 81, founder and board chairman of the **Glidden co.,** on Aug. 25 in Cleveland, O. Glidden Varnish co., which he purchased in 1917, sold approximately $2 million worth of paints and varnishes in its first year. Today, the company does an annual business of more than $250 million.

At the turn of the century he was employed by Swift & co. as a fertilizer salesman.

Andrew B. Shea, first vice president, **W. R. Grace and co.,** was scheduled to deliver a report on Latin America at the Sixth Annual Virginia World Trade conference which was held Sept. 30 and Oct. 1.

The president of Dewey and Almy Chemical co., Hugh S. Ferguson, has been elected a director of **W. R. Grace & co.** A proposal to merge Dewey and Almy into Grace has been approved by the boards of directors of both companies and will be submitted to their stockholders.

Robert I. Sutter will represent **Hammond Bag & Paper co.** in Ohio, according to M. E. Greiner, vice president and general manager.

Died: John R. Lafferty, manager of the New York office of **Hercules Powder co.,** in Alton Bay, N. H., where he was vacationing.

Ford

Highway Equipment co. has announced the appointment of George E. Ford, of Decatur, Ga., as Southeastern district manager. He will serve dealers in Florida, Georgia, South Carolina, North Carolina, Tennessee, Alabama and Mississippi, and headquarter in Decatur.

International Minerals & Chemical corp. Plant Food div. appointments: Fred J. Jilek, former administrative assistant to the division's general manager, has been named assistant to Operating Manager John D. Zigler; Roger L. Huggs, former labor relations supervisor, promoted to division personnel supervisor; Jack W. Hicks becomes manager for area III, operating from Mason City, Ia. and John M. Coates, former sales representative at Mason City, succeeds Hicks as district sales manager.

James W. Taylor has moved up to head research, sales promotion and advertising for **Kraft Bag corp.** This new post was established, Kraft states, to help multiwall sales attain greater objectives in highly competitive fields.

Le Roi co. has named Jack E. Heuser vice president in charge of sales; Ray H. Rodolf, general manager of the Compressor div.; Herschel V. Hiatt, general manager, Engine div. and James R. Harwood, sales manager of the Transo div.

Newly appointed manager of industrial chemicals for **Leffingwell Chemical co.** is Dr. Arnold P. Howe. He had been manager of the Chemical Products dept. of Shell Chemical corp.'s Western div.

Dr. Leslie G. Peck, James H. B. George and Dr. Charles J. Kensler have recently joined the staff of **Arthur D. Little, Inc.** Dr. Peck will be in charge of the computing laboratory, Dr. George will work with the Industrial Chemistry staff and Dr. Kensler will organize and expand the Biology dept.

Frederick W. Wahlers, a member of the New York sales staff of **Merchants Chemical co.,** since 1945, has been appointed assistant sales manager, according to a recent announcement by Lemuel Skidmore, president.

Semet-Solvay coke sales will be handled by Frank M. Moses for **Wilson & Geo. Meyer & Co.** in the 11 western states. The company is western sales agent for the Semet-Solvay div. of Allied Chemical & Dye corp.

Charles E. Trunkey has been named assistant secretary of the **Middle West Soil Improvement committee,** announced Zenas H. Beers, executive secretary. A native of Waterloo, Ia., Trunkey is a graduate of Iowa State College, where he specialized in agronomy. He will assist Beers in field work and in gathering and processing editorial and pictorial material in connection with the educational program sponsored by the committee.

Trunkey

Monsanto Chemical co. has named Desmond B. Hosmer manager of the Anniston, Ala., plant of its Organic Chemicals div. Wallace K. Belin, whom Hosmer replaces, will become production manager of the Monsanto plant now under construction at Kearny, N. J.

Promotion of Marshall W. Butler, assistant to the plant manager at Hopewell, to the newly-created position of assistant to the director at New York, has been announced by **Nitrogen div.,** Allied Chemical & Dye corp. In his new post he will assist the director of production, George B. Meredith.

New agronomist for the Plant Food div. of **Pacific Coast Borax co.** is Ted R. Fisher. He will be responsible for agronomic research work and sales development in the Midwest.

E. M. Kitchen, formerly with the Plant Food div. in the Eastern area, has been transferred to the company's Industrial div., with headquarters in Los Angeles.

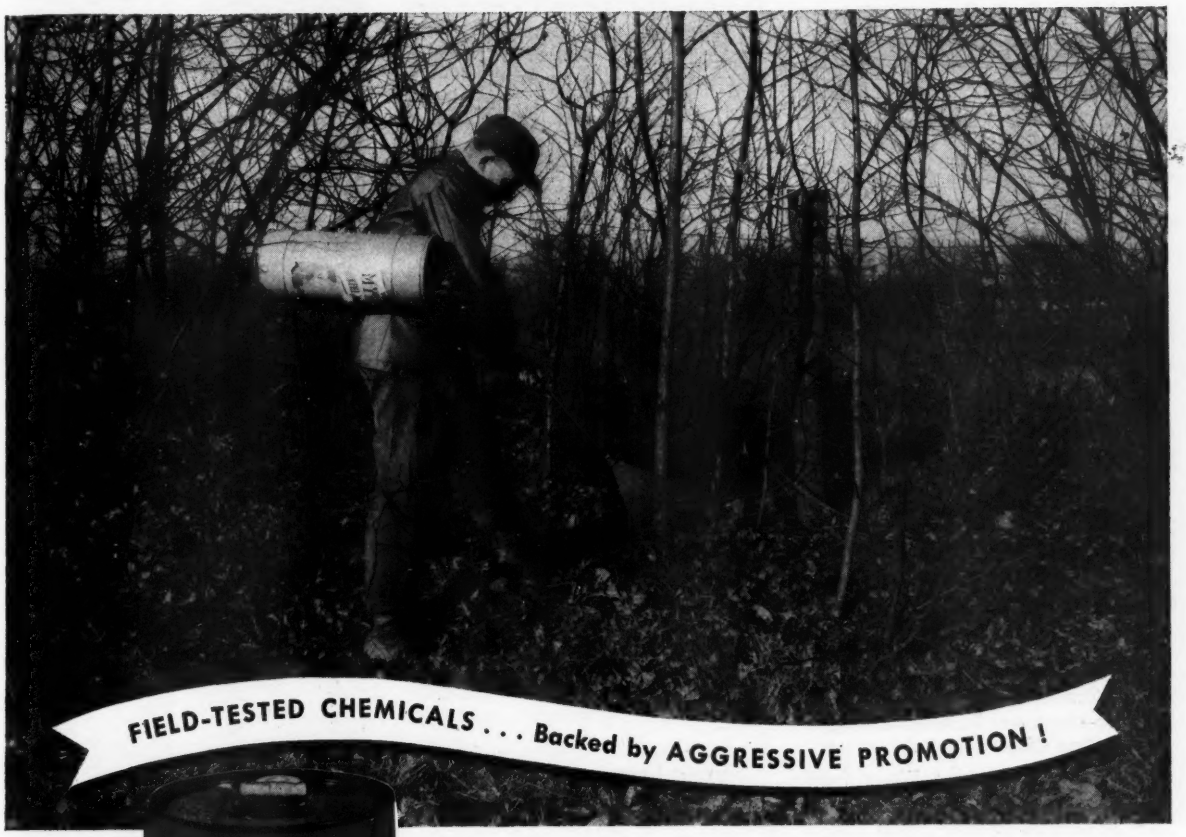
Appointment of C. G. Whinfrey as Northern sales manager for agricultural chemicals has been announced by Fred C. Shanaman, president of **Pennsylvania Salt Manufacturing Co. of Washington.**

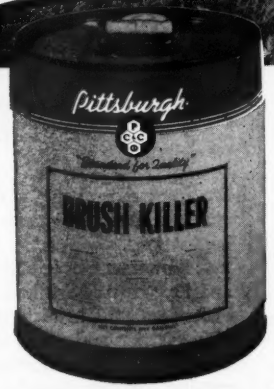
Whinfrey

Whinfrey, who has been with Pennsalt since 1948, had served with the Philadelphia sales office, as agricultural chemicals sales representative in Northeastern states and as sales supervisor for the eastern states. In his new position, he will be responsible for the sales of Penco agricultural chemicals products.

Concurrently, the company announced

Cash in on Dormant Spraying with *Pittsburgh* BRUSH KILLERS





Each year, more brush control programs are being conducted in the dormant season. Off-season basal bark application has many advantages. For example, it avoids the danger of damaging growing crops. It distributes labor over the entire year. It requires less equipment than foliage application and it is easier to reach brush in marshy low lands when the ground is frozen.

So be sure you're set to take advantage of these extra off-season sales and profits by having a good stock of Pittsburgh Brush Killers on hand. We'll be glad to send you special newspaper ad mats and window streamers to help you promote dormant season spraying in your area. *Write today!*

W&D 5366

Standard for Quality

ORGANIC INSECTICIDES: Benzene Hexachloride, Toxaphene, and DDT.

ORGANIC PHOSPHATE INSECTICIDES: Parathion Wettable Powders, Parathion Liquid Concentrate, Systox.

WEED KILLERS: 2,4-D Acid, 2,4-D Amine Concentrates, 2,4-D Ester Formulated Concentrates, D4 (Low Volatile 2,4-D Ester), C4 Pre-Emergence Weed Killer, 2,4,5-T Formulations.

COTTON SPRAYS AND DUSTS, AND OTHER SPECIAL AGRICULTURAL CHEMICALS.

AGRICULTURAL CHEMICALS DIVISION

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PITTSBURGH COKE & CHEMICAL CO.

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COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

that Edward O. Fall has joined Whinfrey's sales staff, serving as sales representative in New England, New York, northern New Jersey and Pennsylvania.

Recent appointments and transfers in territorial sales personnel of **Pittsburgh Coke & Chemical co.'s** Agricultural Chemicals div. include: New district managers—Hugh Swink in charge of the Southern cotton belt area;

Swink

Franz

Carnes

Lewton

A. J. Franz, the Mid-Central states; A. H. Carnes, the North Central and Eastern states and T. G. Lewton, Jr., the Western states.

Transfers—C. Howard Elmer from Charlotte, N. C., to Pittsburgh; S. F. Stewart from St. Louis to Omaha, Nebr.; D. M. Dudley from Dallas to Lubbock, Tex. and Russell W. McCalley, from Pittsburgh to Los Angeles, Calif.

St. Regis Sales co. vice presidents, Harry A. Hughes and Howard C. Peterson, Jr., have been named to positions in **St. Regis Paper co.,** Hughes to assistant general manager of the Multiwall Packaging div. with Peterson succeeding him as the division's Eastern district sales manager.

The paper company also announced other changes within the Multiple Packaging div. William T. Orr has been appointed assistant manager of the Eastern district. Clifford E. Freeman succeeds him as manager of the St. Louis office. Michael T. Biondo has assumed sales responsibility for the majority of Eastern district multiwall bag accounts formerly handled by Dean G. Abercrombie who has been placed in charge of the Buffalo, N. Y. office. Jack Larigan, former sales supervisor of the Minneapolis territory, has been transferred to the Birmingham, Ala., office as Southwestern district manager. He is succeeded at Minneapolis by W. A. Foran. Stuart Versfelt and Jack Morris have been appointed sales representatives in the Minneapolis territory.

The resignation of John W. Rutland as vice president in charge of sales has been announced by **Southern States Phosphate and Fertilizer co.** Rutland is president of Western Carolina Phosphate co. and Smoky Mountain Fertilizer co. Because of the rapid growth of these companies, he feels that he must devote his entire time to his personal interests, Southern States Phosphate stated.

Spencer Chemical co. has appointed Kirk Sanders, former agricultural sales representative in Mississippi, as its southeastern district sales manager. He replaces John L. Sanders, who has resigned to accept a position with Mississippi River Fuel corp., St. Louis, Mo.

Sanders

Kirk Sanders will be in charge of the Spencer Atlanta office and assume responsibility for agricultural chemical sales in South Carolina, Georgia, Florida and Alabama.

Dr. Donald F. Starr has opened an office as a consulting chemist at 256 North Mountain Ave., Montclair, N. J. He will specialize in insecticide, rodenticide and aerosol work.

Robert U. Haslanger has been named to **Stauffer Chemical co.'s** Administrative staff. Formerly general manager of sales of the Texas div., Monsanto Chemical co., he was more recently director of sales for its Plastics div. Haslanger, a chemical engineering graduate of the University of Wisconsin, is headquartered in the Stauffer New York office.

Collins

H. K. "Pat" Collins was recently appointed to cover the Southern San Joaquin Valley of California for **United Chemical co.,** distributors of farm chemicals in the five Western states. He has served as president of the California Fumigators Association and had been employed by American Cyanamid co. for 10 years.

United States Testing co. has assigned Alonzo H. Searl to its Boston branch laboratory. He had been technical service director at Naftone, Inc. and headed research work for Mastic Tile Corp. of America and Armstrong Cork co.

John F. Kirk has been named vice president and director of sales for **Velsicol corp.,** succeeding H. O. Whamond, who has been transferred to

Whamond

Kirk

the parent company, Arvey corp., as vice president in charge of industrial laminations.

A former employee of Allied Chemical and Dye corp., Kirk had been manager of its General Chemical div.'s Philadelphia district and was previously manager of its General Agricultural Chemical dept. in New York.

New administrative assistant at **Velsicol corp.'s** Memphis plant is J. P. Middleton, former production superintendent of insecticide manufacturing.

Charles F. Sanborn, manager of **Wyandotte Chemicals corp.'s** Michigan Alkali div. Market Research dept., has been promoted to senior sales representative in the Eastern district office. Dr. Robert I. Chien has been named manager of market research.

Company Briefs

Albatros Superphosphate Works, of Utrecht, Holland, which owns most of the shares in Albatros Superphosphate and Fertilizer corp., has opened a branch office in New York, managed by N. G. Pierson. The company has also established, in collaboration with Irish interests, the Albatros Fertiliser co., Ltd., in Ireland.

American Potash & Chemical corp. is reported to have offered to exchange 75,000 shares of its class B stock for all outstanding shares of Western Electrochemical co., Henderson, Nev. Negotiations for acquisition of more than 40 per cent of the company's outstanding common stock have been said to be completed. AP&C stated that its offer is contingent on acceptance by 51 per cent of WEC's stockholders.

A complete descriptive catalog of all products manufactured by **American Potash & Chemical corp.** and its subsidiaries has been published and is being mailed to all the company's customers. Included is information on AP&C's farm chemicals, lithium chemicals, organo-borons and other products. Copies are available on request from the corporation, 3030 West Sixth St., Los Angeles 54, Calif.

An all time high in use of industrial explosives was reached last year, stated Ralph K. Gottshall, **Atlas Powder co.** president, in a report to stockholders. According to U. S. Bureau of Mines figures, 791,000,000 pounds of explosives were marketed in 1953, two-thirds above the World War II level and more than double the 1935–39 prewar average. Almost all this increase has been in types of explosives which Atlas produces, said Gottshall, and its dynamite sales in 1953 were the highest in the company's history.

Calunite corp. has named Hal Stebbins, Inc., Los Angeles, to handle advertising and sales promotion for Calunite. This fall an initial test campaign will be begun in California. A national campaign is planned as new markets open.

A research program in molybdenum chemicals has been launched by **Climax Molybdenum co.** To be devoted mainly to research in molybdenum catalysts for upgrading low octane gasolines, in the synthesis of new molybdenum chemicals and in Moly-sulfide, a promising new lubricant, the program will be housed in a modern building adjacent to the present Climax laboratories in Detroit.

A 26 page two-color brochure on the safe handling of chlorine has just been issued by **Columbia-Southern Chemical corp.** Included are details on methods of shipment, instructions for handling, storage, removal from, care and return of containers, first aid measures, etc. Copies of the Chlorine Safe Handling booklet may be had by writing to Columbia-Southern, 632 Fort Duquesne Blvd., Pittsburgh 22, Pa.

A dividend of 25 cents per share was declared by **Commercial Solvents corp.** on its outstanding common stock, and paid Sept. 30 to stockholders of record at the close of business on Sept. 3.

Construction is expected to be started shortly on a modern wood-preserving plant at Avoca, Pa. for **Federal Creosoting co.** to serve Lehigh Valley Railroad, Delaware and Hudson Railroad and other users of pressure-treated wood.

Fertil-Ade of New York, Inc., 104–66 Fourth-third Ave., Corona, N. Y,. has been granted charter of incorporation listing capital stock of 200 shares, no par value. Directors are Francis W. Malito, Marietta Gambardella and Charles S. Gambardella.

Capital of $200,000 has been authorized for **General Fertilizer Service co.,** formed at Fremont, Nebr., to make or deal in fertilizer and farm chemicals. Officers: W. A. Koepplin, pres.; S. D. Daniels, vice pres.; Victor Keilstrup, sec.-treas. Keilstrup is also resident agent.

Distribution of **Grand River Chemical div.,** Deere & co.'s technical grade urea will be handled by R. W. Greeff & co.

Production of technical grade urea is expected to start in the Spring of 1955 at the company's $20 million nitrogen plant which is nearing completion at Pryor, Okla.

International Minerals & Chemical corp.'s net income was $6,043,979, $2.44 a share, for the fiscal year ended June 30, a decline from the $7,030,176 or $2.87 a share reported for the previous fiscal year, according to a report from Louis Ware, president. The decrease, he said, which occurred in spite of record net sales of $93,591,934, was because of losses incurred in starting a new phosphate plant in Florida and a new magnesium oxide and hydrochloric acid plant in New Mexico.

Three new sales agents have been appointed by the Feed Ingredients dept. of **International Minerals & Chemical corp.'s** Phosphate Chemicals div. R. D. Erwin of R. D. Erwin co. with headquarters in Nashville will service western Tennessee, Kentucky and northern Alabama; William F. Smith of Smith Grain co., Limestone, Tenn., will cover eastern Tennessee, the Carolinas and southwestern Virginia and J. A. Lacour, Jr. of Standard Sales co. in Meridian, Miss., will operate in Mississippi and southeastern Louisiana.

Kingman Liquid Fertilizer, Inc. has been formed at Kingman, Kan., with capital of $100,000. Incorporators are Russell Heldenbrand, New Iberia, La., R. Heldenbrand, Sr. and Charles Stewart of Kingman.

McCall Farm Chemicals, Inc. has received a certificate of necessity in the amount of $52,600 for railroad pressure tank cars. Eighty-five per cent has been allowed.

Mississippi Chemical corp.'s plant now employs a total of 267 persons and provides the Yazoo City area with an annual payroll of $1,300,000, announced C. S. Whittington, president. During the past fiscal year, he stated, the plant has turned out 68,921 tons of ammonium nitrate and has produced 21,365 tons of anhydrous ammonia for sale as fertilizer.

Monsanto Chemical co. has asked for bids on construction of a warehouse on West Jefferson St., Trenton, Mich., and is planning a research center on a 250 acre tract of land in Creve Coeur, Mo. Thirty-two laboratory units, 16 offices and a demonstration area are included in the research center for organic chemicals, which was designed by Holabird & Root and Burgee.

The move of its executive offices from 120 Broadway to the new National Distillers Building at 99 Park Avenue has been completed by **National Distillers Products corp.** The company occupies six floors—the 9th to 14th—in the recently completed building. First in New York to be sheathed in aluminum, the N-D building is of modern construction. Interior wall partitions are movable so that working space may be rearranged at any time. There are acoustical ceilings throughout, modern fluorescent lighting, air conditioning, windows consisting of heat absorbent glass and a basement garage.

National Gypsum co. has increased the dividend on its common stock five cents per share and its board of directors has declared a dividend of 45 cents payable Oct. 1 to holders of record Sept. 13. In commenting on the increase, Melvin H. Baker, board chairman, said "Our earnings are up. A portion of this increase will be passed on to stockholders. . . . This will boost the indicated yearly cash dividend rate from $1.60 to $1.80 per share of common stock."

The New Zealand Farmers' Fertilizer Co., Ltd. has reported a net profit for the year ended May 31, 1954 of £92,315.

Production of ammonia at **Nitrogen div.,** Allied Chemical & Dye corp.'s South Point plant is to be increased by 20,000 tons, the company reports. Work is expected to be completed by late 1955.

Nitrogen div.'s Hopewell office building now under construction is expected to be completed by Nov. 15. The one-story building is to be rectangular in shape, built of cinder block faced with red brick. Interior walls will be cinder block painted light green, ceilings will be white, acoustical, and floors will be covered with asphalt tile.

Production of fertilizer at **North American Cyanamid Ltd.'s** Niagara plant was expected to be reduced Sept. 1 because of high inventories. Approximately 150 employees were to be laid off, reducing the plant staff to about 825 persons.

The property and business of **Natural Products Refining co.,** Jersey City, N. J., acquired by Pittsburgh Plate Glass co. under a plan of reorganization on Aug. 17, has been transferred to Columbia-Southern Chemical corp., a wholly-owned subsidiary of Pittsburgh Plate. Robert E. Widing has been named works manager of the plant which consists of 33 buildings covering about five acres of land in Jersey City. Associated with Columbia-Southern since 1943, Widing had served as chief process engineer until his present assignment.

Export activities of **John Powell & co.** were moved on Sept. 3 from One Park Ave. to 745 Fifth Ave., the headquarters office of the Squibb-Mathieson Overseas div. of Mathieson Chemical corp. Personnel remains the same. The move involves John Powell Export corp. and the Overseas div. of John Powell & co., consolidating in one office all the overseas sales activities of Powell and Squibb-Mathieson.

Sinclair Chemicals, Inc. has announced the start of construction on a petrochemicals producing plant at its Marcus Hook, Pa., refinery. The plant will produce 18 million gallons per year of pure aromatic hydrocarbons including toluene, xylenes and paraxylene.

Twelve of the 18 **Smith-Douglass'** safety teams have had no lost time accidents during Jan. 1 to July 31, 1954. Of the 12, one has never had a lost time accident (S-R, Selbyville, Del.); Maint. and Misc., Streater, has had none since January, 1948 and Maint. and Gar., Money Point and S-R, Norfolk, have had none since 1950. Houston, Tex. leads the league with no lost time accidents in 103,435 man hours. Average accident frequency rate for all 18 teams is 5.34, with nine lost time accidents in 1,684,201 man hours.

Foster D. Snell, Inc. has leased space at 42 West 15th st. and will move its Engineering and Chemical Market Abstracts depts. to these new quarters, releasing areas for additional laboratories and office space for expansion of research departments. For the present, all correspondence and telephone calls will be handled at 29 W. 15th St.

The company has appointed John P. Baird Jones technical representative in British Columbia, Canada, with headquarters at 627 Vancouver Block, Vancouver.

A new sales office has been opened by **Swift & co.** at LaGrange, Ga., with C. D. Smith as manager. W. L. Gray will succeed Smith as manager of the Shreveport, La., plant and F. A. McDonal will replace Gray as manager of the Tyler, Tex., branch.

Charter of incorporation has been granted to **Tongin Fertilizer co., Inc.,** Marianna, Ark., listing authorized capital stock at $30,000. Incorporators are Max D. Miller, C. R. West, W. H. Barker and R. H. Lindsey, Jr.

In a recent issue of Stephens-Adamson Mfg. co.'s house organ, THE S-A CONVEYOR, a two-page picture spread appears on the huge stacker the company designed for **Virginia-Carolina Chemical corp.'s** phosphate mining operation at Nichols, Fla. The phosphate rock is stacked at a 635-long ton per hour rate.

Virginia-Carolina Chemical co. net sales rose to a record high of $85,445,975 for the fiscal year ended June 30, while net income was $3,618,198, a decrease compared with the $4,215,874 reported for the previous fiscal year. The company expects that new facilities should contribute materially to earnings for 1954–55, according to Joseph A. Howell, president.

Donald C. Oskin has been named manager of sales, and James R. Harris, assistant manager of sales for **Westvaco Mineral Products div.,** Food Machinery & Chemical corp. Manager of sales for the **Westvaco Chlor-Alkali div.** is Arthur F. Smith, with Preston F. Tinsley assistant manager.

Among products to be sold by the Chlor-Alkali div. are chlorine, carbon bisulfide, carbon tetrachloride and grain fumigant chemicals, while, among other products, Westvaco Mineral Products will sell phosphoric acid. Previously these chemicals were sold by Westvaco Chemical div., which has been inactivated.

Associations & Meetings

Meeting Held by S. C. Group

On Sept. 13, the South Carolina Plant Food Educational Society held its fifth annual meeting at the Clemson House, Clemson, S. C.

"What South Carolina's Agricultural Program Means to Me" was discussed by a fertilizer manufacturer—D. H. Banks of Banks Fertilizer co.; a salesman—J. B. Friday of Naco Fertilizer co.; a dealer— Ira T. Cousins and a farmer—Clifford T. Smith.

Dr. M. D. Farrar, dean of the School of Agriculture, Clemson College, spoke on "Clemson's Agricultural Program and How the Society Can Help Promote It;" Frank Barton, assistant state supervisor of agricultural education, on "South Carolina Young Farmers and Their Interest in Plant Food;" Hugh A. Woodle, leader, Agronomy Extension Work, "Some Accomplishments and Objectives of the Society," and W. R. Allstetter, vice president, National Fertilizer Association, "Fertilizer Does Not Cost—It Pays."

Banquet speaker was Frederic H. Heidleberg, National Cotton Council, and toastmaster, Audley H. Ward, Savannah Valley District Extension Agent.

Southern Weed Conference

The eighth annual meeting of the Southern Weed conference will be held on Jan. 17–19, 1955 at Hotel Soreno, St. Petersburg, Fla., according to an announcement by Dr. Warren C. Shaw, president.

Purpose of the meeting, stated Dr. Shaw, is to bring together all phases of weed control research and education in the southern part of the United States. Attending will be representatives from state experiment stations, USDA, extension services, the farm chemical and farm equipment industries, vocational agriculture and the farming industry.

Officers for the 1955 conference include Dr. G. C. Klingman, North Carolina State College, vice president, and Dr. E. G. Rodgers, Florida Agricultural Experiment Station, secretary-treasurer.

NFA Drops 1955 Fall Convention

The National Fertilizer Association has announced that it will not hold its 1955 fall convention. At the June board of directors meeting it was moved and voted that this meeting should be dispensed with and that further discussion of the matter should be held at the 1954 fall board meeting.

This action includes only the 1955 fall convention. Any permanent change would require a change in By-Laws and a vote by the entire membership.

Weights & Measures Group

At the 38th National Conference on Weights and Measures the Committee on Methods of Sale of Commodities included the following items in its report:

1. Liquid Fertilizer—A liquid fertilizer that does not have at 80° F. a pressure exceeding one atmospheric pressure may be sold by either weight or volume.

2. Seeds—Shall be sold by net weight, and when in package form with contents exceeding ¼ avoirdupois ounce, the net quantity shall be declared on the container together with the identification of the producer or packer.

Oklahoma Plant Food Group Meets

New officers were elected and a new program of activities outlined at a recent meeting of the Oklahoma Plant Food Association. Officers of the organization for 1954–55 are George Summers, Jr., American Cyanamid co., president; Warren Dewlen, Consumers Cooperative Association, vice president; Arnold Newman, Oklahoma Fertilizer, treasurer and Parks A. Yeats, State Board of Agriculture, secretary.

4-H and FFA Contests

The group approved plans to sponsor a wheat fertilization contest this fall in cooperation with the Oklahoma Future Farmers of America and the state 4-H clubs. The two farm youth groups will each compete separately for $500 in cash prizes. Local chapters will compete with each other in the FFA division of the contest. In the 4-H division, competition will be on an individual basis. Judging will be based primarily on percentage of yield increase from proper fertilizer use.

Beginning in September the first issue of a monthly newsletter will be published by the association for association members, agricultural workers and others interested in promoting proper use of fertilizer.

Assistance is to be given by the association in the Extension Service's fertilizer demonstration programs. Identification signs for demonstration plots are being furnished.

A speakers bureau is to be made available by the association, supplying speakers for meetings of farmers and agricultural workers. Visual aids are to be supplied vocational agriculture instructors on fertilizer use. A radio, television, newspaper and magazine publicity program is being planned.

Dealer Meetings

Fertilizer dealer meetings will be held this fall at Shawnee and Chickasha by the association. A membership drive will be held to increase membership from the present 95. Memberships may be held by fertilizer manufacturers, mixers, suppliers and dealers as well as by allied industries. Besides fertilizer industry members, membership now includes banks, bag manufacturers and publications. The organization's new address is Box 3153, Capitol Building, Oklahoma City.

Ceresan for Snow Mold

The success of Ceresan in preventing "snow mold" in several wheat fields in Washington and Idaho has been reported by DuPont co. These test fields happened to be in areas where winterkill due to snow mold wiped out, or damaged severely, unsprayed wheat, said DuPont, but sprayed wheat came through in fine shape, even where early winter snows had fallen on unfrozen ground, and deep snow had remained late in the spring.

Soluble Package Insecticide

A new clear plastic sack which is soluble in water is used by Renflo Chemical co. to package Insaciside, a garden spray recently put on the market. The sealed sack is dropped into a gallon can, water added and the mixture is ready for spraying.

Insaciside is sold in a container of five sacks, which will make a total of five gallons of spray, for $2.00.

Merculine Approval Gained

Merculine, produced by H. L. Woudhuysen & Associates, has been granted label acceptance by Washington and Ottawa. The company says its liquid cereal seed fungicide is effective against bunt or stinking smut of wheat and rye, covered and false smuts of barley, covered and loose smuts of oats, seedling blights of cereals and seed rot and seedling blight of flax.

Retail Warficide Package

d-Con co. is introducing Warficide in retail consumer channels. Packaged in envelopes which make one quart of rat- and mice-killing drinking water, retail price is 39 cents. Previously sales had been limited to the grain and cereal industry.

Equipment & Supplies

All-Weather Michigan Cab

An all-weather, molded steel cab is available for all models of Michigan Tractor shovels being built by its Construction Machinery div., according to Clark Equipment co.

Designed for easy field installation, the heavy-duty cab has all around and overhead vision through safety glass windows set in rubber molding. The

rear section, which has sliding windows, rolls freely on track and can be removed in five minutes. The inside of the cab, which weighs approximately 275 pounds, is sprayed with insultating compound to deaden noise. Standard color is Michigan yellow.

New Richardson System

A new four-page technical reference which pictures and describes Richardson Scale co.'s recently developed servomechanism system is now available from the company. Components of the system are a synchromechanism, control transformer (balancing synchro), servo amplifier and servo motor.

For copies of Technical Reference 54B, write to Richard Steensma, Richardson Scale co., Van Houten ave., Clifton, N. J.

Conveyor Belt Cleaner

The S-A spring type conveyor belt cleaner is designed to remove material adhering to the belt after discharge, thus insuring maximum belt life by preventing cover wear, states Stephens-Adamson Mfg. co. Steel wiper blades perpendicular to the belt surface, but diagonal to its line of travel, scrape off material allowing it to fall to the discharge chute. The blades are mounted on spring steel arms.

Formerly the steel arms exposed a flat surface to the dribble falling from the wiper blades, allowing some material to build up on the flat surface. To remedy this condition the new belt cleaner design incorporates a twist in the arm so that a vertical edge is exposed to the dribble falling from the wiper blades, eliminating any build-up on the arms.

Portable Refrigerator Unit

Cold-Package, a portable refrigerator unit which weighs 45 pounds, is available from A. Daigger & co. Complete with thermostat and mobile cooling coil, the unit plugs into any 115 volt A.C. outlet. It can be put on the job instantly, since it involves no installation difficulties. The portable thermostat is merely set for the desired temperature, cooling coil placed where desired and current switched on. There are no pipe connections or adjustments to make, no mechanical work to be done, according to Daigger.

Soiltest Earth Drill

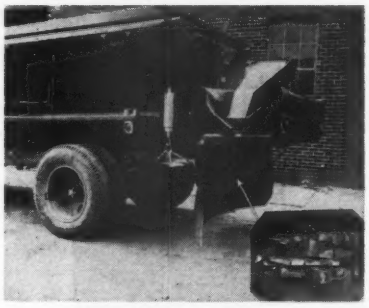
The McCullouch earth drill produces clean straight holes at a high rate of speed and is dependable, versatile and easy to operate, according to Soiltest, Inc.

The company says that the drill is used successfully in soil testing operations due to its ease of portability, adaptability to any size auger. The operator is able to reverse the transmission and easily remove the auger when drilling to depths of 20 to 40 foot range.

New Leader Meter Device

A new metering attachment for use with New Leader commercial fertilizer and lime spreaders has been introduced by Highway Equipment co. The device eliminates much of the guesswork in fertilizer application because it enables the operator to determine the proper feedgate opening for any given output per acre without waste of material.

A test box is included to collect the amount of material coming off the conveyor of the spreader, and this is weighed with the scale furnished. This



weight, when checked against distance traveled, will show the amount of material being spread per acre.

For further information on the attachment, which fits all late model New Leader twin disc spreaders, circle 294 on the Reader Service card.

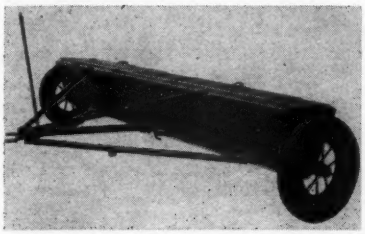
Magnesium Hand Truck

The new Magcoa Model K, a light weight magnesium hand truck of 500 pounds capacity, features a curved-back frame and curved nose plate designed especially for handling kegs, drums and barrels, as well as case goods and other conventional flat-sided loads, according to a report from Magnesium Co. of America. It is available with a choice of wheel sizes and tire types, stair climbers and other accessories.

Baughman No-Stop Spreader

Baughman Manufacturing co. reports that it has designed a new pull-type spreader, the No-Stop, guaranteed for five years.

The body is constructed of solid, one-piece welded 12 gauge steel. The hitch, too, is of extra heavy-duty de-



sign, securely braced in four directions, attached to body with husky electric-welded brackets.

Several distinctive features make the No-Stop unlike any other pull-type spreader, says Baughman. For example, the patented valve design, which regulates rate of discharge, is an ingenious little-hole-and-big-hole design that allows the widest possible spreading range, from seeding to heavy liming.

Fork Truck Drum Clamp

A clamp, designed to rotate drums or other containers for pouring, dumping or stacking operations, has been developed by The Yale & Towne Manufacturing co. This attachment, which picks up drums from either horizontal or vertical position, provides full 180 degree forward and reverse rotation for rapid upending of drums.

Rotating arms are hydraulically actuated and controlled by a lever located convenient to the operator's position. Controlled rotation enables the operator to discharge contents of drums at any selected angle up to the maximum lifting range of the truck.

Easily mounted or detached to convert truck for standard fork operation, the attachment is capable of handling a full 55 gallon drum with a maximum weight of 1,000 pounds, the manufacturer states.

Continuous Blending Controls

A new remote weight-control system for continuously and accurately blending additives with process material has been announced by Richardson Scale co.

Features of the system include batch weighing of additives, continuous weighing of process material and the remote selection of weight ratios using a single dial control. Products handled include chemicals, fertilizers, feeds, foods, rock products and cement. Components of the system are an automatic hopper scale, electric control system, control panel and a constant-weight belt feeder.

Richardson says the system's advantages are rigid process control, immediate start-up, quick formula changing, precise weighing of additives and operation over a wide range of weight ratios.

New Lessmann Loadall

The new Lessmann GFT Loadall Loader, with front wheel drive and rear wheel steering, has been designed for users who are confronted with operating in confined areas, flotation problems, etc. The patented Lessmann Power Crowd feature is used, which allows the

operator to fill the bucket without forward movement of the tractor, the company states.

The loader has full reversing in any speed range from 2 mph to 20 mph. Struck capacity is 22 cubic feet; heaped, 28 cubic feet.

Additional information can be received by circling 311 on Reader Service card.

Clark Now Leasing Michigan Equipment

Michigan power cranes, shovels and tractor shovels, manufactured by Clark Equipment co.'s Construction Machinery div., can now be obtained on a lease basis, either with or without option to purchase, through the company's newly-formed subsidiary, Clark Leasing corp.

Under terms of the plan, equipment is leased to the customer for a three or five-year period. The simple interest rate paid by the customer for leasing is 3.79 per cent of the cost of the equipment.

The lease program is not intended to promote the leasing of equipment in preference to outright purchase, according to Clarence E. Killebrew, Clark vice president.

Bristol Control Units for Test Cabinet Use

A complete line of control instruments for use with environmental test cabinets has been announced by The Bristol co. They can be used to initiate and maintain an entire program of varying climatic conditions within the test cabinet and to simulate any desired temperature, humidity or altitude conditions.

Available in one or two case models depending on application, the program controllers will carry through the program repeatedly and reproduceably, and can also be used to bring temperature, pressure or vacuum up to any desired value and maintain it there for a predetermined length of time, according to Bristol. Accuracy of control is ½ per cent of full scale value. For further information, circle 316 on Reader Service card.

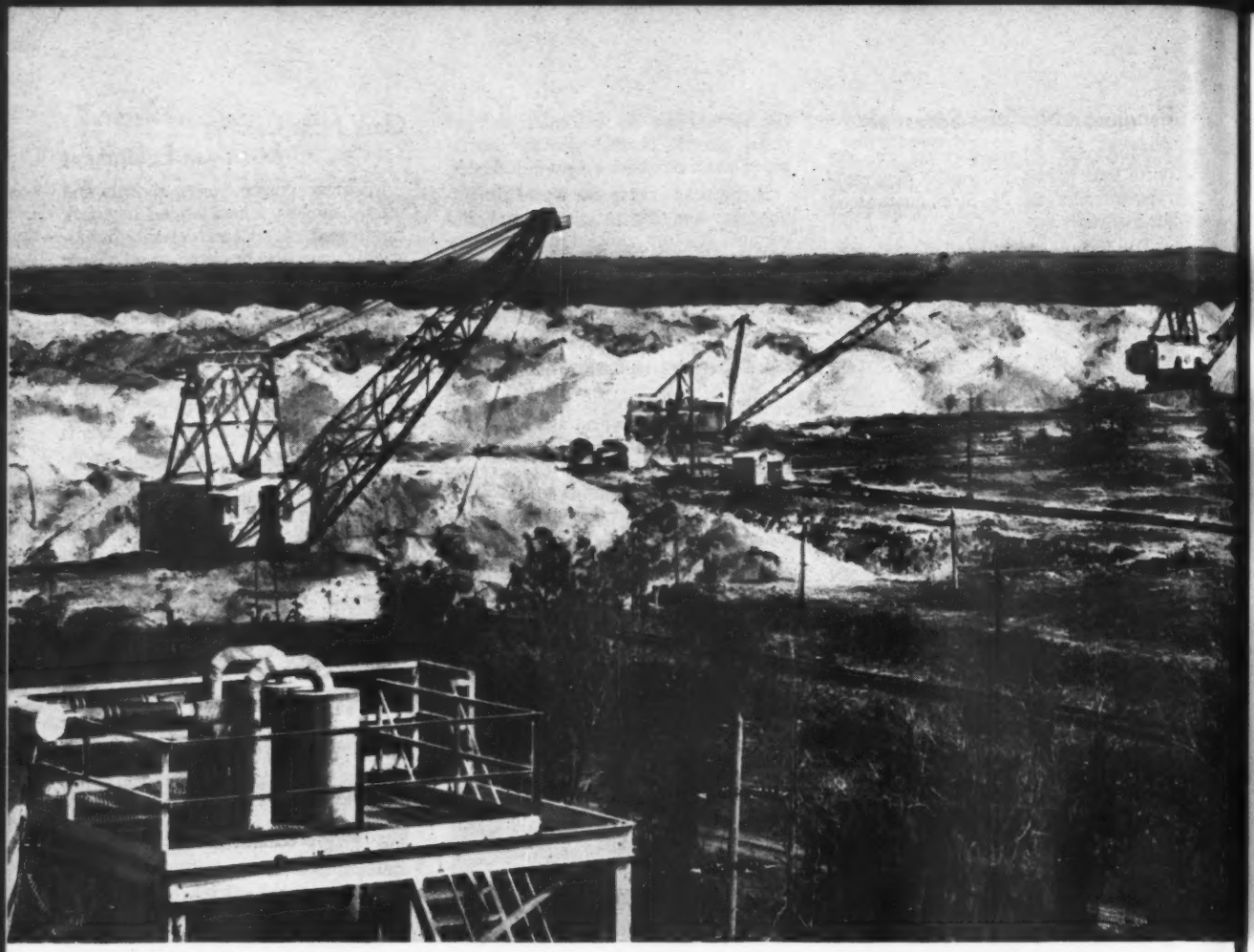
Suppliers' News

Arkell and Smiths Central div. sales office has changed its address from 1384 Grandview, Columbus, O., to 2460 Northwest Boulevard, P. O. Box 5767, Columbus 21.

The Dorr co. and **Oliver United Filters Inc.** have announced the execution of an agreement for the merger of the two companies. Special meetings of the stockholders of both companies will be held this month to approve the agreement, and if so approved the merger will become effective Dec. 31.

Name of the merged company would be Dorr-Oliver Incorporated with headquarters in Stamford, Conn., and the initial board of directors would be equally divided between representatives of the two companies.

Willys Motor, Inc. has purchased Nest-A-Bin co. and has begun volume production of an improved model of the aluminum bulk shipping container which Nest-A-Bin developed. Nest-A-Bins, which fill from the top and empty from the bottom through circular doors, are easily adaptable to standard filling and discharging equipment, Willys states, and products subject to comtamination, deterioration or damage from the elements are completely protected in the bins, which are hermetically sealed at all openings by special non-toxic, plastic gaskets. The company will be known as Kaiser Nest-A-Bin div.



Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

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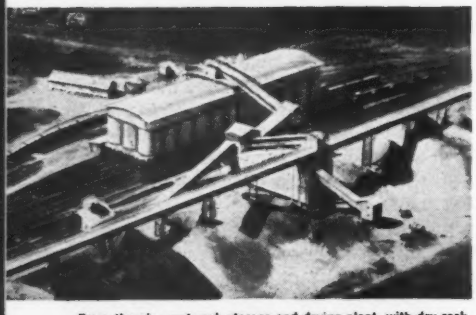

From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

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All grades of Florida Pebble Phosphate Rock
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Washington Report

By Fred Bailey & John Harms

The lid is off the tough diverted acre regulations proclaimed last summer for 1955 farm production.

Administration's retreat from the toughest crop controls in history is looked on cautiously and hopefully in Washington as **a blessing to the farm chemicals industry.**

Under the revised production rules for 1955, farmers can grow a whole variety of crops—previously banned—on land taken out of controlled crops. Land forced out of corn, wheat and cotton by acre allotments could only be planted to pasture and grasses under the original program. Now farmers are allowed to grow unlimited quantities of such things as soybeans, oats, barley, rye, grain sorghums and other cash crops. Only crops farmers will not be permitted to grow as they wish are potatoes, sweetpotatoes, vegetables for commercial market and dry edible beans.

Farmers still will be encouraged to grow more grasses, especially in South and Southwest, under the revised program. New provisions of the Agricultural Conservation Program (ACP), and other conservation programs are designed to expand grazing lands in dry areas.

While as much new grassland probably won't be started under the revised program as under the original plan, farmers have been educated to grassland possibilities. The growing trend of more fertilizer on grasslands and more pesticide protection is expected to be accelerated next year even though the grassland program falls somewhat short of original intentions.

Fertilizer use is expected to increase in 1955, it's believed here. The question as to whether total plant food use would be higher because of farmers' inclination to work for better yields on fewer acres, seems to be settled. Thinking here is that farmers will continue to push for higher yields in major crops like corn and cotton, but will also add more fertilizer to other cash crops now permitted to be grown under the program revision.

Another bright factor on the horizon is the improved outlook for farm income. With lower price supports next year, the stringent production controls were bound to make deep inroads into farm income. This would tend to put a ceiling on farm expenditures for fertilizer and other chemicals. But under the new rules, farm income is not likely to drop as sharply as economists had earlier predicted.

Reasons for the sudden drastic ease-up on production controls next year include the increasing seriousness of the drought, changes ordered by Congress in the new farm law, a prospective shortage of protein foods and the fear that farmer resentment might carry over to the Nov. 2 elections.

Reaction of industry representatives in Washington to the relaxation order goes like this:

Paul T. Truitt, president, American Plant Food Council: "The modified diverted acres program just announced by the Secretary of Agriculture, offers farmers a better opportunity for more efficient land management with an adequate fertilization program. When the secretary extended the program to crops that otherwise are not a surplus, he created an opportunity for more efficient utilization of fertilizers

on pasture and forage crops as well. In taking this step, the secretary doubtless realizes that in many areas in the United States, farmers are using only half as much fertilizers as their experiment stations recommend."

National Fertilizer Association: "USDA's tough diverted acres program will focus the attention of farmers as never before on methods of squeezing every last cent of profit from each bushel, pound or ton of farm output. This should result in further increases in the average per acre rate of fertilizer application to 1955 crops inasmuch as proper use of fertilizer generally is the most effective method of reducing unit production costs.

"The virtual elimination of the total allotment regulation announced by USDA on Sept. 15 will allow farmers considerable more flexibility in 1955. The announcement was good news to the fertilizer industry as well as to farmers because it means farmers will be able to plant almost anything they wish, without penalty.

"The USDA campaign to encourage planting of more hay and pasture and cover crops on diverted acres also affords an excellent opportunity to the fertilizer industry for expanded sales. This is particularly true because the Federal government generally will share up to 50 per cent of the cost—including fertilizer—of establishing these crops under the Agricultural Conservation Program.

"When all of these factors are taken into consideration there is good reason to believe that fertilizer consumption will continue to expand in 1955."

Lea Hitchner, National Agricultural Chemicals Association: "Generally speaking, I don't think acreage changes have too much effect on pesticide sales. Three reasons for this: (1) Where acreage cuts are made, farmers tend to take better care of their remaining acreage. (2) Predominant influence on farmer use of pesticides is the weather and insect infestation. (3) Diverted acre program would have influenced pesticide use from the standpoint of grasslands and grazing fields. More and more farmers find profitable uses of pesticides on grasses. This grasslands thing is something on which we haven't yet even scratched the surface."

Domestic fertilizer producers are to be on more equal footing with foreign producers in bidding for foreign aid contracts. New policy announced by the Foreign Operations Administration commits that agency to equalize freight rates on foreign aid shipments when a domestic producer is obliged to use U.S. flag vessels. The policy results from the 50-50 provision in the Mutual Security Act.

Under the new policy, American producers will quote bids both for shipment on U.S. and foreign flag vessels. Bids will be awarded as usual on the basis of lowest landed cost to the government with the execption that the lowest of two bids submitted by a domestic producer will be used in settling on the bid award.

Formerly, foreign fertilizer producers had the edge on bids on the basis of lower freight rates. Foreign bids on the material itself often were higher than the domestic bid, but lower freight rates made the difference.

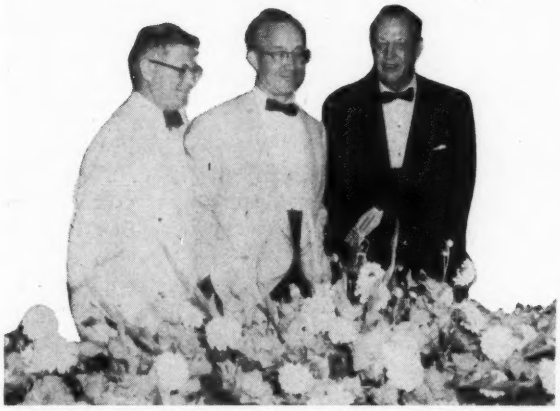
Announcement of the first tentative pesticide tolerances by the Food & Drug Administration was expected soon after we went to press. FDA plan was to publish tolerance in tentative form for more than 100 chemicals in the Federal Register before October was far along. After the tentative tolerances are published, chemical manufacturers, users and the public will have 30 days in which to file objections, if any.

FDA's plan was to use as much of the existing record as possible in setting tolerances, and do as much work as possible before the mechanics of the Miller amendments come into play. But if controversy becomes too great over some of the tentatively-proposed tolerances—if FDA is forced to either set tolerances too low to satisfy protestants, or set zero tolerances—protestants would then have to file new applications for tolerances using Miller amendment procedures.

Manufacturers would not be charged fees for work already done on the more than 100 chemicals for which tentative tolerances are coming up. But if further work is needed on the tentative tolerances, fees would be charged.

NAC Views Miller Bill

FDA Cooperation Pledged at Industry-Government Panel Discussion of Amendment



Retiring NAC president, Paul Mayfield; new president, W. W. Allen, and Hallam Boyd, Commercial Chemical co.

MANY questions aroused by passage of the Miller Bill were answered for NAC members by a panel discussion of the legislation at the 21st annual meeting of the National Agricultural Chemicals Association at Spring Lake, N. J., Sept. 10–13. The air wasn't entirely cleared at the conclusion of this session however; some important questions remained unanswered and a diversity of opinion on the part of industry and government authorities was evident.

FDA's representative on the panel, Wm. W. Goodrich, assured the industry of continued cooperation and cited the cooperation of government and industry representatives in drafting the legislation.

Paul Mayfield, Hercules Powder co., retired as NAC president after only one year as head of the organization, turning over the gavel to W. W. Allen, Dow Chemical co. The newly elected vice president of NAC is Fred W. Hatch, Shell Chemical corp.

In his address (an edited version appears next month), Mayfield stressed the importance of trade associations and pointed to the excellent work performed by NAC executive secretary Lea Hitchner and his staff.

Hitchner's Report

In his annual report, Executive Secretary Lea Hitchner pointed to advances made through a "vigorous program conducted during the last two years involving product liability." He reported that results of the Department of Commerce survey of world insecticide markets should be ready for release during the early part of the new fiscal year.

Hitchner requested the cooperation of NAC members with a cooperative USDA-industry study of inventory stocks. NAC plans for the coming year include addition of tolerance information to the Law Guide Service. Under consideration is the appointment of a permanent Medical committee; expansion of publicity information program; a program for distribution of data prepared by the Public Health Service on clinical memoranda for physicians' use in the diagnosis and treatment of pesticide poisoning and a folder designed to combat "adverse claims and unsubstantiated critical publicity" on use of pesticides.

Once again, Hitchner reported, NAC is sponsoring use of the Inter-Association Council's publicity and poster program.

Portions of the talks presented by Dr. David E. Price and Dr.

C. K. Allen, Phelps-Dodge Refining, and J. W. Moore, Floridin co.

Mr. and Mrs. Arthur H. Carter, Sherwin Williams of Canada; Mrs. H. S. Smith; F. D. Evans, Naugatuck Chem. div.; H. S. Smith, Allied Basic Chem. co.; J. G. Hastings Canadian Industries (1954) Ltd.; Mrs. J. K. Brown; and George Flemmings, Natural Products company.

Robert Wert, Attapulgus div., Min. &Chem. corp.

LEFT: R. W. Roth, Velsicol; D. E. Snyder, Standard Oil of Ind.; P. Wittlinger, Wm. Cooper & Nephews & J. F. Kirk, Velsicol. RIGHT: A. H. Carnes, H. F. Tomasek, W. T. McLaughlin, W. S. James, J. D. Mochi, Pittsburgh Coke.

LEFT: L. D. Hatch, Monsanto; A. S. Pfeil, Doggett-Pfeil; H. B. Pratt, B. G. Pratt co. RIGHT: L. K. Brunn & B. S. Hyde, Atlas Powder; W. M. Rohrer, Naco; R. W. Breidenbach, Comm. Solvents and L. R. Gardner, Cal. Spray-Chem.

LEFT: W. H. MacHale, Naugatuck Chem. div.; Mrs. & Mr. E. C. Gerdes, Geigy; T. J. White, American Cyanamid. RIGHT: Mr. & Mrs. J. E. Murray, Tenn. Corp.; E. C. Baillie, Pitts. Plate Glass; Harold Cunningham, Rohm & Haas.

LEFT: F. B. Porter, Tenn. Corp.; M. C. Morton and F. M. Thomas, Sr., Central Chem. Corp. RIGHT: O. L. Staerker, Tenn. Prod.; J. L. Giles, Mich. Chem.; J. H. Hoeffler, B. G. Pratt co.; G. F. Kerby, Fairfield Chem. div.

Members of the Inter-Association Council of Pesticide and Applicator Manufacturers (PAM) met at Spring Lake during the NAC convention, to map plans for a 1955 public relations program.

Frank H. Jeter appear as separate articles in this issue, along with principal statements of the panel discussion on "How to Operate Under the Miller Pesticide Residue Amendment" and the papers by Dr. William R. Jester and John C. Dunegan.

Training Sales Personnel

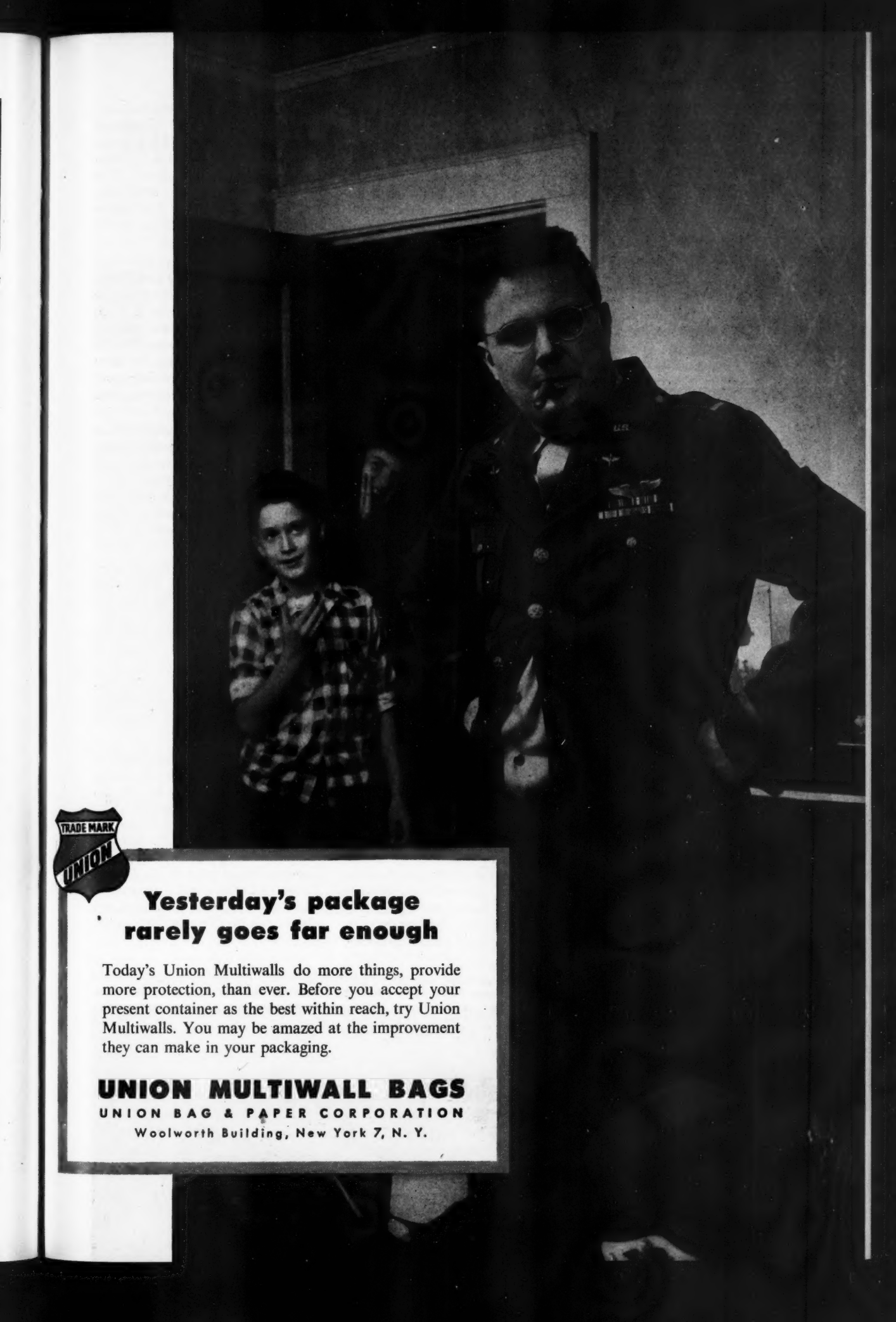
In his talk on a "Sales Personnel Training Program," W. R. Dixon, assistant general manager, Dow Chemical co., presented a method of screening candidates for sales positions which seems rather involved but which, Dixon said, has paid off.

Although Dow salesmen are selected from colleges, this is not considered the one salient qualification and the company attempts to get sales candidates with a native background.

Heavy emphasis is placed on picking men active in extra-curricular activities, those who were leaders on the campus. After being satisfied on initial requirements, an employment interview form is filled out setting forth all knowledge of the candidate. Dixon stated that considerable stress is placed on this because they feel past behavior is the key to future activity.

After the preliminaries, the would-be salesman is listed on a qualification form, a four page affair stressing these questions: Is he smart? will he work hard? loyalty; does he get along with people? do you think he can sell? Subsequent steps include situations in which the applicant is called on to initiate conversations and the preparation of a sales rating sheet that again proves his qualifications.

Phone conversations with applicant references follow after which top Dow sales management goes over the qualifications offering, to those who seem to measure up to specifications, the sum of $370.00



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Today's Union Multiwalls do more things, provide more protection, than ever. Before you accept your present container as the best within reach, try Union Multiwalls. You may be amazed at the improvement they can make in your packaging.

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J. H. Rogers, W. W. Tice and D. R. Stoneleigh, O. Mathieson Chem. corp.

Wils Mowry, Hopkins Agric'l. Chem. Co.; C. G. Whinfrey, Pennsalt and E. H. Karr, Pennsalt of Washington.

E. K. Plant & E. D. Witman, Columbia Southern; E. C. Baillie, Pitts. Plate; John Babbage, Central Chem.

per month following graduation with a BS.

Following graduation the applicant enters the training center for a three part course, three weeks of orientation, six weeks of sales training and 13 weeks of general training.

Three weeks prior to course completion the applicant is again reviewed to assure that Dow is hiring the right person and to ascertain the type of person he is and the type of assignment he should receive.

Now an employee, the new Dow man is sent to the office of his first assignment, preceeded by his record indicating the type of work for which he is best suited. Dixon indicated the near fool proofness of the Dow system by stating that they fired only seven of 120 new sales personnel.

Following Dixon, Kenneth H. Anderson, associate director, National Committee on Boys and Girls Work, Inc., reviewed in his talk on "Youth . . . Your Customer Today and Tomorrow," the importance of work being accomplished with 4-H Club groups.

Farmer Needs

"Too many people are not analyzing the needs of their No. 1 customer—the farmer," said E. H. Fallon, assistant general manager, GLF Exchange. The concluding speaker on the program, he went on to explain some of the things that they have been doing to cope with the situation, and also to reduce the cost of their materials to their customers.

As an example, Fallon said that 20 per cent of their feed materials now by-pass the warehouse through direct farm delivery, a practice that reduces costs 7 per cent.

Fallon expressed a rather definite feeling that he did not believe subsidies to be good for the farmers. He added that GLF is against price supports using as an example of their deleterious effects the butter-oleomargarine situation. The fact that, since 1950, margarine has taken one-half of the butter market, he feels, is due to parity prices.

The coop executive pointed out that 34 per cent of our farms produce 85 per cent of farm products indicating that there is a large ground operating with no point of return. He brought out the changes which have taken place in farm living, the influences of improved transportation, rural electrification and other factors.

Heavy emphasis was placed on prices received by farmers which, according to Fallon, are down 28 per cent. He stated that only a few years ago farmers received 55 per cent of every consumer dollar but that the figure is now down to 44 per cent.

Fallon offered seven points to consider when dealing with your number one customer: Be sure the product is right for the intended use; sell service; don't sell for profit alone; keep up and maintain quality; do research and development work; remember that mechanization of farms has to be on a volume basis and that the farm market is worth 32.8 billion dollars.

Three members of the board of directors were elected for five year terms and included Chester M. Brown, General Chemical div.; Charles H. Sommer, Jr., Monsanto Chemical co.; and J. V. Vernon, Niagara Chemical div. Retiring from the board were J. M. Taylor, Taylor Chemical co.; Byron P. Webster, Chipman Chemical co. and James McConnon, McConnoh & co. ◆

A. W. Mohr and E. W. Cannon, Cal-Spray.

Presentation of gifts to retiring board members Jack Taylor, Taylor Chemical; James McConnon, McConnon & co. and Byron P. Webster Chipman Chemical, by past NAC head Mayfield.

Relationship of Pesticides to Health

David E. Price, M.D.
Assistant Surgeon General
Public Health Service, USDHEW

Price

YOUR products, as you are well aware, are increasing the yield of world agriculture many times over and are thus helping to swell the food supply for millions of people throughout the world. They are also helping to curb and eliminate diseases which have ravaged many countries and have robbed their people of energy and productive capacity. On the other hand, constant vigilance must be maintained against the possible dangers to human health through the unwise or premature or inadequately tested use of chemical compounds. . . .

The accomplishments of the new pesticides have been spectacular, indeed. However, several important problems have appeared in connection with their use. Among these are (1) the development of satisfactory insecticide formulations for use in tropical countries; (2) the acquisition of resistance by many species of insects and (3) the potential toxic hazard to humans from the use of some of the new compounds.

The Savannah laboratories of the Public Health Service's Communicable Disease Center are helping on the preparation of a satisfactory DDT specification. They are also testing other insecticides which may be used against Anopheles mosquitoes—the carriers of malaria—which become resistant to chlorinated hydrocarbon compounds. . . .

Our weapons in the fight against vector-borne diseases are continually depleted by the ever-increasing resistance of insects to available pesticides. Intensive efforts are being made to meet this problem. New compounds are being developed and, for a while, serve as adequate replacements. Insects quickly become resistant to these compounds, however, especially those similar in structure and mode of action to chemicals now in use.

Compounds with a different structure and mode of action usually give better results; for example, organic phosphorus insecticides have been used with success against insects which had become resistant to the chlorinated hydrocarbons. Attempts are being made to develop synergists which may be added to DDT formulations to enhance their lethal effect and overcome resistance.

The nature of resistance developed by various species of insects is also under study. Although slow and tedious, this approach should give us ultimately the information with which to overcome the acquired immunity of insects to pesticides. . . .

Toxicity to Humans

The problem of toxicity to humans is equally large and complex. . . .

Although cases of acute poisoning have been reported for some of the newer pesticidal chemicals, their record is generally good. Objections to their use have ranged from the serious to the unfounded or ridiculous. Insecticides, particularly DDT, have been alleged to be responsible for a variety of gastrointestinal complaints, a wide range of psychoneurotic disturbances, as well as for an increase in poliomyelitis, cancer and other diseases.

The vast majority of physicians and other scientists who have studied the problem do not accept these claims. The consensus is that, properly used, insecticides do not cause any diseases or increased susceptibility to disease in either man or animals. This opinion is based on the results of extensive research.

Let me cite by way of example a few studies conducted by Public Service investigators. A comprehensive study was carried out in the Mississippi Delta to determine whether the widespread use of insecticides had any adverse effects on the health of people living in that area. In one small city insecticides had been accused of being the cause or a contributing cause of fungus infections, hay fever, asthma, sinusitis, gastrointestinal upsets, cancer, poliomyelitis, heart diseases and a host of other diseases.

In addition to clinical studies, reviews were made of school attendance records, state and area-wide mortality records and morbidity records of a plantation hospital. Disease experience was compared for the periods before and after the introduction of the new agricultural chemicals. Similar comparisons were made between the regions along the Mississippi where insecticides were used sparingly and the Delta where agricultural chemicals were used extensively in cotton culture.

In this study, our investigators found no evidence that pesticides were related to the occurrence of disease.

. . . The cumulative properties of new compounds must be carefully evaluated. . . . Organic phosphorus compounds have generally been considered quite unstable and therefore devoid of a residue problem. Recent experiments have shown, with certain systemics at least, that this is untrue; fruit sprayed with heavy dosages of these compounds remain toxic to experimental animals for many months.

Progress in creating new chemical agents readily exceeds progress in the laborious toxicological testing necessary to their safe application. This important work needs to be expanded.

Insecticide Formulations

. . . Difficulties have been encountered with some insecticides, particularly DDT wettable powders, which become defective after arrival overseas. Each such episode is prejudicial to the health objectives of our foreign aid program as well as to the reputation of American industry. Of equal significance is the propaganda capital which can be made from the failure of inferior products.

Much of the difficulty experienced has been due to inadequate specifications provided to the manufacturer by government purchasing agencies, although in a few instances materials of inferior quality were supplied. The Public Health Service is cooperating with USDA, FOA and a committee of your own organization to improve and standardize the specifications for insecticides. . . .

Industry has growing responsibilities in the field of toxicology. The governmental agencies involved in the approval of labeling of pesticides are keenly aware of industry's efforts and expense in the search for and development of new compounds. We in government appreciate the inconveniences that sometimes result from restraints imposed upon the marketing of new compounds. However, reasonable doubts about the safety of pesticides must be resolved before the products are offered to the public. Premature approval could result in serious damage not only to the public health, but also to the reputation and profits of the industry. . . .

Toxicological evaluation, as you know, is expensive and time consuming. Your industry is to be commended for its substantial contribution in investigations which have gained rapid acceptance of new materials. Your segment of the American chemical industry has, I think, compiled a first-rate record in this respect.

Moreover, your accomplishments have made possible significant advancement in our national health and living standards, and international relations. Through the combined efforts and continued cooperation of government and private enterprise, we can look forward to even greater achievements in the future. ◆

How to Operate Under the Miller Pesticide Residue Amendment

Moderator

Lea S. Hitchner
Executive Secretary
NAC Association

THE Miller Bill, H. R. 7125, now Public Law 518, was signed by President Eisenhower on July 22, 1954. Our association is privileged to have on the program . . . men who are particularly well qualified to discuss various phases of this legislation. . . .

It is with great regret that it is not possible to have George Burroughs, formerly a member of Mr. Conner's law firm, as a member of the panel. Unfortunately, Mr. Burroughs passed away after the drafting of the bill had been completed, but before it was passed and signed by the President. . . .

I want to emphasize . . . that this legislation was by no means a one-person or one-group activity. Numerous suggestions, contributions and compromises were made by members of Congress, farm groups, the food industry, scientific organizations and land-grant colleges, as well as Federal agencies and the industry.

The bill, with the exception of the amendment for the fees was passed without change.

The pesticide industry and agriculture have a vital interest in two types of Federal legislation. The original Insecticide Act was passed in 1910 and modernized and amended in 1947. The first Food and Drug Act was passed in 1906 but had no special reference to pesticides. The amended Food, Drug and Cosmetic Act of 1938 first recognized this problem.

Relationship Now Recognized

The present legislation recognizes the relationship and the part each of these acts play in the control of pesticides. The history of food and drug pesticide legislation, however, has been an unfortunate one. The problem of residues is not new. Those acquainted with it remember from the late '20's and particularly the early '30's the general dissatisfaction on the part of the government, the industry and the farm interests over the interpretation and application of the law, and the great confusion which existed at all levels.

As a result of the confusion and uncertainties . . . an effort was made, in drafting what was to become the Food, Drug and Cosmetic Act of 1938, to provide a means for controlling the residue problem. That procedure appeared to be all right, but experience has proven that it has not worked.

Because of the failure of the previous legislation and due to the increased interest created by the development of the many organic pesticides, the present legislation was introduced in Congress and passed.

The passage of the law in itself solves nothing. The value . . . depends upon intelligent administration and the cooperation of those regulating it. . . .

The present legislation . . . with the unanimous support and cooperation of all interested groups . . . we believe has an excellent chance of becoming an effective instrument in protecting the public health and making possible the production and safe use of pesticides.

George P. Larrick, the new commissioner of Food and Drugs, has expressed his confidence in this matter in a letter from which I quote:

"The Miller Amendment . . . will promote the health of the American people. It deals fairly but adequately with the farmer's interests and those of the manufacturers of agricultural chemicals. It is our hope that in the administration of this statute, the closest industry-government cooperation may continue. . . ." ◆

REAPING THE PROFITS

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LET me set the stage for the more detailed discussion of the provisions of this bill by summarizing it very briefly. John Coyne, Bill Goodrich and Joe Noone will then fill in the details of this legislation.

What the Bill Does

What does this bill do? In substance it says that after the effective date any food will be deemed to be adulterated if it contains the residue of a pesticide which is not generally considered to be safe unless (1) the amount of the residue is within the limits of a tolerance which has been established by regulation or (2) the residue has been specifically exempted from the necessity of a tolerance by regulation. There are, therefore, two types of regulatory action which can be taken with regard to a specific pesticide. First, it may be exempted from the necessity of a tolerance and second, a specific tolerances or tolerance can be established. . . .

Procedure for Regulatory Action

Through what procedure can this regulatory action be taken? First, the bill permits any person who has registered a pesticide or who has applied for registration to initiate the proceeding to establish a tolerance or obtain an exemption relating to one of its constituent pesticidal chemicals. . . .

Secondly, the new legislation substitutes an informal type of procedure based upon a prompt time schedule for the old formal proceeding with its indefinite and protracted time schedule. If this . . . fails to produce an accord, any interested party is given the right of a full hearing and judicial review.

Products Included

To what products does the new pesticide residue amendment apply? It was only after protracted consideration . . . that the decision was made to limit this legislation to pesticidal residues remaining on raw agricultural commodities. . . . Pesticidal residues on processed foods will remain subject to the provisions of existing law.

Industry

John D. Connor
Counsel
NAC Association

When Effective

When does this new law become effective? The procedural provisions of the new law became effective immediately upon its enactment on July 22, although it is not anticipated that the procedure for establishing new tolerances will be utilized until after the Secretary of HEW has issued regulations spelling out in more detail the procedure to be followed. The adulteration provisions of the new law do not become effective until July 22, 1955, except in the case of products for which tolerances are issued before that date. The date can be extended until July 22, 1956, at the discretion of the Secretary of HEW. . . .

You must decide promptly how your products will fit into this pattern. Do they fall into the group for which proposed tolerance on fruits and vegetables may shortly be issued? Should you take the initiative in petitioning to have tolerances or additional tolerances established? If so, when should this be done? Should it be done individually or in cooperation with other companies?

These are a few of the questions which you must answer if you are to be prepared to operate properly under this new law. . . . ◆

USDA

John T. Coyne
Assistant Head
Pesticide Regulation Section
Plant Pest Control Branch, ARS

THE Secretary of Agriculture has designated the Plant Pest Control branch, Pesticide Regulation section, Agricultural Research Service, to administer sec. 408 (1) of the Miller Pesticide Residue Amendment. . . .

Two Basic Responsibilities

The Plant Pest Control branch has two basic responsibilities under Public Law 518:

(1) It shall certify to the Secretary of HEW as to the usefulness of a pesticide chemical for the purpose for which a tolerance or exemption is sought.

(2) It shall submit with any certification of usefulness an opinion based on the data before it, whether the tolerance or exemption proposed by the petitioner reasonably reflects the amount of residue likely to result when the pesticide chemical is used in the manner proposed for the purpose for which certification is made.

Since the certification of usefulness is the primary responsibility of the Department of Agriculture under the law, it might be well to set forth the interpretation which the department has given to the term "useful." We feel that the usefulness of a pesticide chemical should be determined on the basis of its practical biological or pesticidal effectiveness. Pesticidal effectiveness may be established in terms of percentage reduction or control of pests or, when appropriate, increase in yield or quality of crop following application of the specified pesticides under the conditions prescribed, compared with results from adequate controls. In determining practical effectiveness consideration may be given to other economic gain or practical benefit. . . .

The processing of copies of petitions for tolerances within the branch will follow almost the same channels as applications for registration under the Federal law governing pesticides. However, the considerations are not identical because factors other than pesticidal effectiveness are considered in granting registration under the Federal Pesticide Law and many of these

factors have no relation to the setting of tolerances.

Upon receipt of a copy of a petition in the Plant Pest Control branch, it will be directed to the Registration unit of the Pesticide Regulation section. In this unit, a working file is established for the product; data pertinent to its registration status and intended uses are recorded, before it is forwarded to the appropriate technical unit for consideration of usefulness. . . .

After the appropriate technical unit has evaluated the chemicals for usefulness, all of them will be processed to the Chemical unit for an evaluation of the residue data. . . .

In this regard, we want to emphatically urge the industry folks to base their figures on experimental evidence adequate to insure accuracy. . . . The tolerance requested must be directly based on the data to allow us to render an affirmative opinion.

Use of ARS Committee

In some cases the Plant Pest Control branch may request the assistance of the Pesticide Residue committee of the Agricultural Research Service to properly evaluate the petition with regard to the opinion on residue. . . .

Membership consists of one representative of each Research and Regulatory Program area (except Farm and Land Management), the State Experiment Stations div. and such other representatives as the administrator may appoint.

In any event, the law requires that the certification and opinion must be completed within 30 days or within 60 days if upon notice to the petitioner prior to the expiration of the first 30 days, the branch deems it necessary to postpone action for an additional 30 days.

Upon the expiration of the 30 or 60 day period . . . the branch . . . will when warranted certify to the Secretary of HEW that the pesticide chemical is useful for the purpose for which a tolerance or exemption is sought. Concurrently, the branch will notify the petitioner. . . .

However, if the data will not justify affirmative certification the branch will notify the petitioner by registered letter that it proposes to certify that the pesticide chemical does not appear to be useful . . . or appears to be useful for some of the purposes for which a tolerance or exemption is sought and state the reasons. . . . The person requesting the certification has one week . . . to invoke the hearing provisions of the law, or request limited certification or may pursue both courses of action. If requested, the branch chief will provide for a prompt hearing.

In no event shall the entire process including the time required to hold the hearing exceed 160 days.

It might be well to point out that in those cases where a tolerance or exemption is sought simultaneously with an application for registration of a new chemical . . . . it is anticipated that in the usual case registration of a new economic poison will not be granted until after the tolerance or exemption is established for the proposed agricultural use and there is evidence that the resulting residue will not exceed the tolerance. However, if the application for registration proposes uses for which no tolerance or exemption is applicable registration can be granted with respect to those uses.

The new law also affects the administration of the Federal Insecticide, Fungicide and Rodenticide Act in that it makes provision for the Secretary of HEW to establish a temporary tolerance in the case of an experimental product or exempt such a pesticide chemical from a tolerance. . . .

It is our belief that the announcement of tolerances for pesticide chemicals now registered . . . will not result in drastic revisions of existing labeling. We believe that the past and existing cooperative effort between the Food and Drug Administration and ourselves has done and will continue to do much to preclude any appreciable hardship on the industry from tolerances.

We also believe that with the cooperation that has been generally characteristic of you folks in the past, this legislation can be put to work to the benefit of all concerned. ◆

FDA

William W. Goodrich
Assistant General Counsel
Food & Drug Administration, USDHEW

AS A representative of the Food and Drug Administration, I suppose I naturally assume the role of the villain. . . . Let me assure you . . . that I have no forked tail; neither has our new commissioner, George Larrick. Nor do we approach our new responsibilities under the . . . amendment with an "anti-chemicals" attitude. We hope to continue the cooperation with your industry that has brought the new law into being. . . .

In its essence, this law makes two fundamental changes . . . first, it . . . assigns agricultural functions to the Secretary of Agriculture and health functions to the Secretary of Health, Education and Welfare.

Secretary Benson must decide questions of agricultural usefulness and probable residue levels resulting after use of pesticide chemicals; Secretary Hobby must decide what residue levels may be safely tolerated without hazard to man. . . .

Second, the law emphasizes informal procedures, newly designed to facilitate action and to grant a more dominant role to the scientists. The formal type of hearing . . . is utilized only as a last resort before taking the matter to court. . . .

Application for a Tolerance or Exemption

The new law contemplates that the moving party in obtaining a tolerance will, in most cases, be the manufacturer or formulator of the pesticide. He is the person in the best position to supply sound . . . data. . . .

We in HEW are not required to take action until we receive from the USDA a certificate of usefulness and a statement of residue levels likely to remain on raw agricultural commodities. With this certificate in hand, we have the responsibility of studying the

scientific data contained in the petition and of fixing a safe tolerance within 90 days.

There will, no doubt, be informal discussions between our scientific and technical people and the petitioner or his representatives during the 90 day period. At any time within that period, either the petitioner or the department may refer the problem to a special ad hoc committee established within the National Academy of Sciences.

These committees are to be comprised of scientific men particularly qualified in the subject matter. They are to be of suitably diversified experience, and at least one member of each committee is to be drawn from the land grant colleges.

The thought is that the scientific data in the petition, and any other pertinent information, will be studied by this group, either around the table or perhaps in some cases without a meeting, and an informed scientific opinion expressed as to what residue may be tolerated safely.

The report of the advisory group must be made within a maximum of 90 days. The secretary then fixes the tolerance.

Objections

The formal procedure, where . . . necessary, follows the secretary's announcement of the tolerance.

Any person adversely affected may file his objections within 30 days. The petitioner has two weeks to reply. The matter then proceeds to a public hearing—in which the ad hoc committee's report is made part of the record—and the final tolerance is established on the basis of the evidence presented at the hearing. Judicial review, in accordance with the Administrative Procedure Act, may be obtained.

All of this will cost money, so Congress authorized the establishment of fees to make the service self-supporting as nearly as possible.

The first thing to be done in implementing the new legislation is the promulgation of basic operating regulations. These will be concerned with the following things:

1. Interpretations explaining what is regarded as a "raw agricultural commodity;" what the relationship of the established tolerance is to foods produced from raw agricultural commodities; how to find out whether we regard a particular pesticide chemical as unsafe and a tolerance necessary; how tolerances will be fixed for related poisonous and deleterious pesticide chemicals and what the bases are for fixing the tolerance at zero.
2. The procedure for filing petitions; what data they must contain before they may be considered and what will be done when the petition is incomplete in important respects.
3. The procedure for the appointment and functioning of ad hoc advisory committees.
4. The procedure in the event a formal hearing is necessary.
5. The procedure for establishing temporary tolerances and for amending or repealing tolerances.
6. The fees to be charged for various services under the statute. . . .

We know that all . . . are deeply interested in the fee provisions. We intend to fix the fees as low as possible to cover costs alone. This will be done by requiring an advance deposit of a fixed amount and refunding any money above the actual cost. . . .

Many of you are concerned with the temporary tolerances for pesticide chemicals covered by experimental permits. We hope that these tolerances can be promptly worked out at the scientific level through consultation with our staff people. . . .

I know that there are many other questions . . . we stand ready to consult with you at all times to solve any problem of mutual concern. ◆

Industry

Joseph A. Noone
Technical Advisor
NAC Association

NOW that the Miller Bill is law, how are tolerances to be set? Several answers are possible depending upon whether the pesticide chemical involved is one which has been on the market for some years or whether it is a new one; also on whether it is the manufacturer or the Food and Drug Administration which takes the initiative in proposing the establishment of a tolerance.

As you know, public hearings were held in 1950 for the purpose of establishing tolerances on pesticides then used in the production of fresh fruits and vegetables. . . . It is our understanding that the data have been thoroughly reviewed and the proposed tolerances for the various chemicals included in the hearings decided upon by the government. Apparently, all that remains to be done before proposed tolerances could be announced is the drafting of an order in finished form.

Issuance of Tolerances

With the passage of the Miller Bill, the Secretary of HEW may issue these proposed tolerances in one of two ways. The Secretary may issue them on the basis of the 1950 hearings, as would have been done if the Miller Bill had not been enacted. In this case, the proposed tolerances must be based entirely on the evidence of record submitted during the 1950 hearings.

The Secretary may also issue these tolerances as proposals under the terms of the Miller Bill. Under this alternative, the Secretary may consider not only the data submitted during the 1950 hearings, but also any other data which have become available since then. Also, under this procedure, the Secretary is not restricted to setting tolerances for those pesticides included within the 1950 hearings, but may set tolerances on others as well. . . .

Proposed Tolerances

We understand that the FDA will issue in the near future proposed tolerances for most pesticides now in use. However, we also understand that final decision has not been made as to which of the two alternative procedures will be adopted for this purpose.

In any event, the tolerances initially published will be in the form of proposed tolerances only. Properly interested parties will have an opportunity to submit their views thereon in either case.

Let us take now the situation where some tolerances have been announced. If a company is marketing a pesticide for certain food-crop uses for which no tolerance has been established by FDA under either of the foregoing procedures and the company desires such a tolerance, then it must take the initiative and proceed to obtain it under the terms of the Miller Pesticide Residue Amendment. . . .

A company desiring a tolerance files a petition with FDA requesting that a tolerance be established. In its petition the company specifies the tolerance which it desires and includes pertinent data on the pesticide chemical, its chemical identity and composition, reports on toxicity studies, results of residue studies including a description of the analytical methods used, practicable methods for removing any anticipated residues which exceed the proposed tolerance and a statement of the proposed uses.

The company also submits a copy of this petition and data to the USDA requesting that it certify to the FDA that the pesticide is useful for the purposes for which the tolerance is sought and that the tolerance requested is in line with the amount of residue likely to remain when the product is used as proposed.

Within 30 days after the petition is filed, the Secretary of Health, Education and Welfare publishes in the Federal Register a notice that the tolerance has been requested. This puts interested parties on notice that proceedings are about to get under way.

What happens from this point on depends on whether or not USDA and FDA agree with the company that the requested tolerance is justified on the basis of the data submitted.

Taking first the ideal situation. The USDA agrees with the company that the product is useful and that the requested tolerance is in line with the residues to be expected from its use and so certifies to FDA. FDA likewise agrees with the company that the requested tolerance is safe. In that event, FDA publishes in the Federal Register a regulation establishing the tolerance as requested. . . .

If the USDA is not satisfied that the data establishes usefulness, it so notifies the company, which can then request a public hearing on the issue if it so desires. Final decision is based upon the findings of the hearing.

If Agriculture does not certify that a product is useful for the purposes for which a tolerance is sought, FDA does nothing further with the petition. In other words, FDA's consideration of a tolerance is conditioned upon USDA's certification that the product is useful for the purposes for which the tolerance is sought.

Use of Advisory Committee

Turning now to a situation where USDA certifies that a product is useful but FDA indicates that it does not intend to establish the tolerance as requested. Under these circumstances, the company may request that the petition and all the data be referred to an Advisory committee selected by the National Academy of Sciences for their study and recommendations.

The Secretary of Health, Education and Welfare may refer any request for a tolerance to such a committee whenever he thinks it desirable and we anticipate that this will be done at times. . . . While the Advisory committee is reviewing the petition, the company and FDA both have the right to consult with the committee. After studying the data, the Advisory committee submits its report and recommendations.

The recommendations of the Advisory committee are not binding upon the Secretary of HEW. However, it is anticipated that in most instances the recommendations of the Advisory committee will be accepted and a tolerance published in accordance with them. Likewise, it is anticipated that the company requesting a tolerance will normally accept the recommendations of the Advisory committee even though it may mean a tolerance lower than that requested.

Once a tolerance is published, anyone adversely affected by it may file objections and request a public hearing. . . . On the basis of the evidence submitted at the hearing, which would normally include the report and recommendations of the Advisory committee, the Secretary of HEW would issue a new regulation affirming or modifying the previously published tolerance.

Anyone who would be adversely affected by a regulation establishing a tolerance may obtain judicial review of it in a normal manner. . . . ◆

Non-Drug Uses of Antibiotics


Jester

William R. Jester
Assistant Director
Division of Antibiotics
Food & Drug Administration, USDHEW

RESEARCH in the use of antibiotics as agricultural pesticides reached its peak in 1953. In February of this year two antibiotic manufacturers simultaneously and independently submitted to the Food and Drug Administration for review the results of a series of experiments concerning the use of streptomycin and a combination of streptomycin and oxytetracycline (Terramycin) in the control of fireblight in apple and pear trees and blight of walnut trees in the Pacific Coast area. Accompanying the data were labeling for proposed commercial preparations. In the meantime, applications had been made to the USDA for registration of these products under the Insecticide, Fungicide and Rodenticide Act. Since

this is not a drug use the antibiotic regulations were amended March 31, 1954 by adding section 146.9 which reads as follows:

"Antibiotics for agricultural use. An article that contains one or more of the antibiotic substances described in this part and intended solely for application to plants for the control of plant diseases caused by microorganisms and conspicuously so labeled is not subject to the requirements of section 502 (1) and 507 of the Federal Food, Drug & Cosmetic Act, if it contains one or more suitable denaturants that make it unfit for drug use; but in no case shall it be exempt from the requirements of section 502 (1) and 507 of the act if it is represented or intended to be administered to man or other animals for the cure, mitigation, treatment or prevention of disease or as an animal feed supplement."

Since the issuance of this order by the secretary, the Miller Bill with respect to residues of pesticides in or on raw agricultural commodities has become law. Antibiotic substances in or on food are subject to the food provisions of the Federal Food, Drug and Cosmetic Act. Therefore, the Miller Bill will be controlling if tolerances for antibiotic residues in food are established. . . .

Practically all of the present day non-drug uses and proposed uses for antibiotics are in the field of agriculture. This is not too surprising when you consider that antibiotics in themselves are products of the soil. However, it is not unlikely that they may be found to be useful in many industries other than agriculture.

I would like to conclude with a word of caution. We should never lose sight of the fact that the primary reason for being of the antibiotic is to heal the sick. We should ever be alert to prevent their use in any manner that would negate their value as important life-saving drugs. If pesticidal uses for antibiotics result in a petition for the establishment of a tolerance for antibiotic residues in or on food, it seems evident that the department will establish a tolerance designed to safeguard their effectiveness when used as drugs. ◆

Antibiotics in Plant Disease Control

John C. Dunegan

Principal Pathologist
Agricultural Research Service
U. S. Department of Agriculture

Dunegan

THE term antibiotic is widely used in the popular press these days. An antibiotic may be defined as a material elaborated by certain microorganisms that exerts an inhibitive or destructive effect upon the growth of other microorganisms. . . .

More than 3,000 antibiotic materials have been discovered and investigated since 1942. Very few of these are actually in use today, but the production of five commonly used antibiotics reached the surprising total of 740 tons in 1953. . . .

. . . We should point out that the agricultural uses we will discuss in most instances involve treatments with relatively crude preparations. The dosages, however, are based on the quantity of active material present. . . . We now think in terms of parts per million (ppm) rather than pounds per gallon. . . .

Used for Pear Blight

Fruit pathologists have been confronted for many years with the pear blight problem. . . . Since really satisfactory control measures are not available it is not surprising to find numerous investigators during the past few years testing the efficiency of antibiotic materials for blight control. . . .

Streptomycin and mixtures of streptomycin and Terramycin have drastically reduced blight infections on apples and pears. For example, in a rather elaborate experiment at Marysville, Calif., this season involving 600 Bartlett pear trees, we demonstrated that dosages of the streptomycin-Terramycin mixture as low as 30–3 ppm respectively when applied five times gave satisfactory control; and when concentrations of the mixture at 60–6 and 100–10 ppm respectively were used the control began to approach complete elimination. Actually at the highest concentration there was only one infection in every six trees as contrasted with nine infections per tree in the check plots.

We found, in addition, that an interval of 14 days between sprays gave less satisfactory results than a 7-day interval, but the most striking result of the experiment was the demonstration that five sprays of the mixture at the lowest concentration (30–3 ppm) gave us just as good results as three sprays of the mixture at the highest concentration (100–10 ppm).

In the East, several investigators have reported control of blight on apple trees by use of three to five applications of streptomycin at concentrations varying from 60 to 250 ppm. . . .

Cycloheximide for Fruit Diseases

Cycloheximide, or Acti-dione, is another antibiotic material being used in fruit disease control. It is produced by the same fungus that elaborates streptomycin but is distinctly different in that cycloheximide is antifungal. Originally it was tested against certain mildew fungi. . . . later found to control turf diseases and rust of mint. It is now being used extensively for the control of cherry leaf spot. Pending completion of toxicological tests cycloheximide is recommended for only post-harvest use on bearing trees but can be used all season on non-bearing trees. . . .

Cycloheximide is an extremely potent material and is used at the rate of 2 ppm. This compound is supplied to the growers in the form of tablets. . . .

Endomycin is another antibiotic material being tested in field experiments. It is closely related to, if

not identical with, a compound called helixin. Endomycin is antibacterial and antifungal. It has been tested against a number of plant diseases including apple scab. . . .

Widespread Testing

. . . At Plant Industry Station streptomycin at 500 ppm eradicated halo blight of beans in field test plots. Bacterial spot in commercial tomato plant beds has been controlled with streptomycin and a mixture of streptomycin and Terramycin by a Florida Experiment Station worker. In California bacterial canker of tomato plants was markedly reduced by soaking infected seeds in a 100 ppm streptomycin solution before planting.

Bacterial spot of pepper plants was effectively reduced in Florida tests by spraying the plant beds with a streptomycin-Terramycin mixture, and the same disease, according to reports from Delaware, was almost eliminated by spraying badly infected field 3 times with streptomycin at 500 ppm.

In Maine, it was found that soaking potato seed pieces for 30 minutes in a solution of streptomycin or a mixture of streptomycin and Terramycin was an effective way of controlling blackleg and soft-rot decay.

Work is under way at the Wisconsin Experiment Station on the control of grain diseases with several materials (helixin, toximycin, antimycin) that possess antifungal properties. . . .

Tobacco blue mold, a fungus disease, has been controlled in laboratory tests at Plant Industry Station with sprays of streptomycin at 100 and 200 ppm. . . .

Other workers at the same station have investigated the possibility of retarding the action of quick-acting decay organisms on packaged vegetables. . . .

Little information is available on how the various antibiotic materials produce the results observed. We know definitely that they are absorbed and move through the plants. At high concentrations (500 or 1,000 ppm) some of the materials appear actually to kill (eradicate) the disease-producing organisms. . . .

Antibiotics Become Systemic

We do know that once the antibiotic materials are absorbed they become systemic and in some way prevent bacterial infections from becoming established. The duration of this internal therapeutic effect is not known and probably varies with the antibiotic material, the disease-producing organism and the species of plant treated. It would appear from our California pear blight experiment that the effect did not persist for 14 days when the lower concentrations of the antibiotic mixture (30–3 and 60–6 ppm) were used. On the other hand, we have noted for two years that the effect of Terramycin injected into the trunks of peach trees retarded the defoliation due to the bacterial spot organism throughout the season. Since in these experiments bacterial infections were reduced but not eliminated it is very probable that we induced changes in the host plant.

Time Element Involved

We also know, as the result of various field spraying experiments, that there is a time element involved in the absorption of antibiotic materials by plant tissues. Rain within a few hours after their application adversely affects the absorption of antibiotic materials but rain has little effect after 24 hours.

Results obtained in 1954 tend to indicate that the addition of a fungicide to the antibiotic material affects the absorption of the latter. It would seem that the best procedure is to apply the antibiotic alone and the fungicide, if needed, at least 24 hours later.

In the vast majority of instances, applications of the antibiotic materials to the soil have been disappointing. . . .

Cost Estimates

For fruit disease control we believe a cost of $50 per acre per season is close to maximum figure allowable unless it is known that damage resulting from present treatments produces excessive losses. If a given antibiotic can be purchased by the grower at 20 cents per gram activity, for example, the 30–3 ppm mixture used in the California experiment mentioned earlier, would cost approximately $68 per acre per season for the treatment applied five times at the rate of 600 gallons per acre, per application. In some California pear orchards the loss per acre from copper injury is higher than this figure in most seasons, and in these orchards the use of antibiotic materials for the control of pear blight would be commercially feasible. The results obtained with five applications at 30–3 ppm versus 3 at 100–10 ppm are particularly interesting. The same degree of blight control was achieved with materials that would cost (still assuming a price of 20 cents per gram activity) $68 per acre per season as was obtained with a treatment that would cost $138 per acre per season. Labor charges for the two additional sprays would have to be added to the cost of the 30–3 ppm treatment.

In the East . . . it is anticipated only three applications will be necessary per season to control blight on apples. For the most part the experimental work in the East has involved the use of 100 ppm treatments. At this concentration, materials for three applications at the rate of 400 gallons per acre, would cost approximately $90 per acre per season. . . .

We have used a theoretical price of 20 cents per gram activity, merely to illustrate how we are approaching the feasibility of general commercial use in the fruit disease control field. . . .

The control of pear blight with antibiotics in California orchards, however, poses the question of blight control on high-quality pears in the East. We have yet to demonstrate the feasibility of this under our humid eastern conditions, but this year an experimental planting of 100 Bartlett pear trees was made at Plant Industry Station. We propose to protect these trees solely with antibiotic materials during the blight season. . . .

Several years ago I publicly lamented that plant pathologists did not have magic control materials like DDT, parathion, BHC and others possessed by our entomological colleagues. Our prospects are now much brighter, for the antibiotic materials offer possibilities of disease control we hardly dared dream of 10 years ago. ◆

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THAT industry which is successful today, or perhaps which even survives profitably, gives careful evaluation to its policies and its actions as they may be understood or construed by the public. Conversely, it has the right to give the public the better viewpoint, if that be necessary. . . .

When any group or organization begins to consider its public relations obligation, it must keep in mind that public relations involves all the dealings of that enterprise with the public. It is based on the idea that to have friends one must be friendly. . . .

Public relations means the giving of service, not merely telling about it. It means, further, that the good will of those with whom we work, and to whom we sell, is essential. . . .

Publicity is a part of good public relations. At one time, publicity was merely propaganda, or press agentry. . . . Publicity is now used as a part of good public relations to inform the public; therefore, it is valuable in a democracy like ours because it helps to prevent a distortion of the truth—a misunderstanding of the facts.

Media for Education

The membership of NAC, being almost entirely commercial, does not, of course, have freely available all the media for mass education. Many of these media are available, however, and nowadays when advertising has become of increasing importance in our entire business life, it is but natural to assume that the members of this association will use that media in every way possible for mass education.

But, this is the age of communications. In addition to direct advertising, associations and other similar organizations have available the distribution of information and news through the columns of the daily and weekly press and through the agricultural magazines. There are stories, too, which could be told on the radio and there are still others, of course, which could be used on television. Informative facts can be supplied to the professional entomologists, plant pathologists and others concerned with the use of pesticides in the control of insects and diseases. . . .

The Local Dealer

Few of our manufacturers and dealers in agricultural services pay enough attention to their local representatives. This local dealer . . . is the key man with whom the farmer—the ultimate consumer—comes into contact, and when the dealer gives the proper kind of local service, he makes a friend for the product. It's vitally important that the dealer inform his clerks or salesmen how to read and interpret the labels on the packages which they sell.

Every dealer has the responsibility of insisting that those who buy pesticides should hold these poisons in the proper respect. Anything that will kill insects or control a fungus is poisonous. If it wasn't—it wouldn't kill 'em. This respect for pesticides is an elementary truth which should always be stressed. . . .

Dr. Frank H. Jeter
Information Director
N. C. State College of Agriculture

As time goes on and as more county agents and extension specialists are being trained for work at the county level, it becomes apparent that an annual pesticide conference is one of the most important gatherings of the year, in any state. The manufacturers, distributors and salesmen should be represented and should be emphatic in their fight for including on the recommended list those mixtures which they believe will do a job. They, in turn, should respect the finding of the experiment station. Once recommendations have been agreed upon, this agreement should be observed by all parties concerned.

'Long-Haired' Boys

You have to contend with these "long-haired" boys with fads. Among them are the organic gardeners and those who say that a bit of muck soil, limestone, cowpost or green sand spread over the soil is a positive cure for all kinds of plant diseases and is an effective insect control. There are those who insist that fertilizers cause cancer and that half the ills of the human race come directly as a result of the use of pesticides. They have no evidence to support such a theory, but it sounds good.

To refute these silly claims, one has only to tell the wonderful story of what insect control has been able to do for mankind.

. . . But, perhaps even they are not the most dangerous enemies to the cause of better control of insects and plant diseases, and therefore of better farming. There is another and an even more insidious termite . . . the gentleman who has high standing . . . because of his training or because of some high educational attainment in his chosen field. . . . Whatever he may be he often sounds off with some unwarranted statement about the dangers of spraying or dusting, and he doesn't make the least effort to learn the true facts. . . .

There are those, you know, who believe and respect him for his great knowledge in his own field. Far too often he "sounds off" about spraying without knowledge and on the least provocation.

Those of us who are engaged in the manufacturing and distributing of insecticides should hold firmly to the belief that we are rendering an important public service Sometimes we make errors, as does everyone, but you who are members of NAC have a wonderful story to tell. . . .

We may never entirely overcome the ill effects of the barbed comments, nor the insidious propaganda with which the pesticide industry is afflicted, and with which it may perhaps always have to contend; but after all, the truth—the real truth—is so much greater than the false, that you need have no shame nor any hesitancy in telling your magnificent story. ◆

Fertilizer Situation 1954-55

FERTILIZER movement was "exceedingly slow" during the first half of 1954, according to "The Fertilizer Situation for 1954-55," although deliveries of plant nutrients in 1953-54 totaled 6.215 million tons compared with 5.957 million tons delivered in 1952-53.

1953-54 Nitrogen Fertilizer Supply

(Trade delivery basis)

Source	Ammonium Nitrate All Grades	Ammonium Sulfate & Ammonium Sulfate Nitrate [2]	Other Solids [3]	Natural Organics [4]	Compound Ammoniating Solutions $AN-NH_3$ & UAL [5]	Ammonia for Ammoniation [6]	Ammonia for Direct Application	Nitrogen Solutions for Direct Application [7]	Total by Source
U. S. Production									
Synthetic ammonia	339,000	135,000	87,000	--	391,000	105,000	333,000	51,000	1,441,000
By-product ammonia	--	182,000	--	--	--	3,000	--	--	185,000
Natural organics	--	--	--	35,000	--	--	--	--	35,000
Total	339,000	317,000	87,000	35,000	391,000	108,000	333,000	51,000	1,661,000
Exports	1,000	19,000	21,000	1,000	19,000	1,000	--	--	62,000
Net Domestic Production	338,000	298,000	66,000	34,000	372,000	107,000	333,000	51,000	1,599,000
Imports	139,000	107,000	171,000	4,000	--	--	--	--	421,000
Total Supply - U. S. & Possessions	477,000	405,000	237,000	38,000	372,000	107,000	333,000	51,000	2,020,000

[1] Based upon special reports from primary producers of synthetic ammonia, importers and other sources.
[2] Includes estimated ammonium sulfate content of imported and exported mixed fertilizers.
[3] Includes estimated ammonium phosphates, sodium nitrate, urea mixtures, calcium nitrate and cyanamid.
[4] Estimated nitrogen content of natural organics used in commercial fertilizer.
[5] Includes estimated nitrogen content derived from solutions and ammonia in exported ammoniated superphosphates and mixed fertilizers.
[6] Includes small quantities of ammonia solutions and ammonia liquor.
[7] Includes compound nitrogen solutions, ammonium nitrate solutions and aqua ammonia used for this purpose.

Estimated 1954-55 Nitrogen Fertilizer Supply

Source	Ammonium Nitrate All Grades	Ammonium Sulfate & Ammonium Sulfate Nitrate [1]	Other Solids [2]	Natural Organics [3]	Compound Ammoniating Solutions $AN-NH_3$ & UAL [4]	Ammonia for Ammoniation [5]	Ammonia for Direct Application	Nitrogen Solutions for Direct Application [6]	Total by Source
U. S. Production									
Synthetic ammonia [7]	360,000	133,000	130,000	--	410,000	120,000	395,000	75,000	1,623,000
By-product ammonia	--	180,000	--	--	--	3,000	--	--	183,000
Natural organics	--	--	--	35,000	--	--	--	--	35,000
Total	360,000	313,000	130,000	35,000	410,000	123,000	395,000	75,000	1,841,000
Exports	1,000	19,000	21,000	1,000	19,000	1,000	--	--	62,000
Net Domestic Production	359,000	294,000	109,000	34,000	391,000	122,000	395,000	75,000	1,779,000
Imports	139,000	107,000	171,000	4,000	--	--	--	--	421,000
Total Supply - U. S. & Possessions	498,000	401,000	280,000	38,000	391,000	122,000	395,000	75,000	2,200,000

[1] Includes estimated ammonium sulfate content of imported and exported fertilizer.
[2] Includes estimated ammonium phosphates, sodium nitrate, urea mixtures, calcium nitrate, cyanamid and nitraphosphates.
[3] Estimated nitrogen content of natural organics used in commercial fertilizer.
[4] Includes estimated nitrogen content derived from solutions and ammonia in exported ammoniated superphosphates and mixed fertilizers.
[5] Includes small quantities of ammonia solutions and ammonia liquor.
[6] Includes compound nitrogen solutions, ammonium nitrate solutions and aqua ammonia used for this purpose.
[7] U. S. production synthetic ammonia based on prospective production pattern rather than capacity of the industry to produce.

1953-54 Phosphate Fertilizer Supply

(Trade delivery basis)

(In tons of 2,000 pounds available phosphoric oxide (P_2O_5)

Source	Normal superphosphate	Concentrated superphosphate	Other[1]	Total by source
U. S. Production	1,663,000[2]	491,000	239,000	2,393,000
Exports	56,000	16,000	16,000[3]	88,000
Net supply, U. S. production	1,607,000	475,000	223,000	2,302,000
Imports	—	2,000	60,000	62,000
Total Supply—U. S. and Possessions	1,607,000	477,000	283,000	2,364,000

[1] Includes estimates for complex phosphatic materials. [2] Includes wet-base goods and enriched. [3] Includes P_2O_5 content of prepared phosphatic mixtures, ammonium phosphates and ammoniated superphosphates.

1954-55 Phosphate Fertilizer Supply

(In tons of 2,000 pounds available phosphoric oxide (P_2O_5)

Source	Normal superphosphate	Concentrated superphosphate	Other[1]	Total by source
U. S. Production[4]	1,590,000[2]	526,000	260,000	2,376,000
Exports	56,000	16,000	16,000[3]	88,000
Net supply, U. S. production	1,534,000	510,000	244,000	2,288,000
Imports	—	2,000	60,000[3]	62,000
Total supply—U. S. and Possessions	1,534,000	512,000	304,000	2,350,000

[1] Includes estimates for complex phosphatic materials. [2] Includes wet-base goods and enriched. [3] Includes P_2O_5 content of prepared phosphatic mixtures, ammonium phosphates and ammoniated superphosphates. [4] U. S. production is based on consumption trends and prospective demand rather than capacity of the industry to produce.

Prepared by J. N. Lowe, fertilizer staff specialist, Food and Materials Requirements div., Commodity Stabilization Service, the report states that consuming channels absorbed the increased supply in 1953-54 with less apparent carryover than that for the previous year. Prices were irregular, averaging slightly below 1952-53 and are expected to remain at or slightly below the same level for 1954-55.

The aggregate 1954-55 supply of NPK is expected to exceed that for 1953-54 by an estimated 5 per cent.

Nitrogen

Nitrogen supplies for 1954-55 for fertilizer purposes will total about 2.2 million tons, an increase of about 8 per cent over 1953-54.

Supplies of solid N materials for 1954-55 will comprise, it is estimated, about 55 per cent of the total supply, compared with 57 per cent for the previous year. Stabilization of the solid-wet materials situation was aided by completion of three new urea facilities with a combined annual capacity of 260,000 tons 45 per cent urea.

Reviewing status of the nitrogen expansion goals, now set at 3,500,000 tons by January 1, 1957, the report indicates that supplies should be ample for all needs through 1959, assuming that the goals are met.

1953-54 Potash Fertilizer Supply

(Trade delivery basis)

(In tons of 2,000 pounds potassium oxide (K_2O) content)

Source	Muriate of potash 60% and 50% grade	Sulfate of potash & sulfate of potash magnesia	Manure Salts	Misc. & by-product materials[1]	Total by Source
Deliveries from U. S. production	1,629,000	100,000	1,000	34,000	1,764,000
Exports	44,000	6,000	—	4,000	54,000
Net Supply—U. S. production	1,585,000	94,000	1,000	30,000	1,710,000
Imports	90,000	25,000	—	6,000	121,000
Total Supply—U. S. and Possessions	1,675,000	119,000	1,000	36,000	1,831,000

[1] Includes potash content of oilseed meal and by-product residues used for fertilizer, potassium nitrate and calculated potash content of mixed fertilizers, exported and imported.

Estimated 1954-55 Potash Fertilizer Supply

(In tons of 2,000 pounds potassium oxide (K_2O) content)

Source	Muriate of potash 60% and 50% grade	Sulfate of potash & sulfate of potash magnesia	Manure Salts	Misc. & by-product materials[1]	Total by Source
Deliveries from U. S. production	1,755,000	110,000	3,000	35,000	1,903,000
Exports	44,000	6,000	—	4,000	54,000
Net supply—U. S. production[2]	1,711,000	104,000	3,000	31,000	1,849,000
Imports	90,000	25,000	—	6,000	121,000
Total Supply—U. S. and Possessions	1,801,000	129,000	3,000	37,000	1,970,000

[1] Includes potash content of oilseed meal and by-product residues used for fertilizer, potassium nitrate and calculated potash content of mixed fertilizers, exported and imported. [2] Net supply from U. S. production is based on prospective demand rather than capacity of the industry to deliver from domestic production. The above-ground supply may be in excess of the figures shown.

Here's a summary of the present situation:

	Capacity T/N/Yr.
Total capacity 18 original plants, 1/1/51	1,448,000
1951 expansion	109,800
1952 expansion	227,000
1953, Jan-June expansion	8,900
1953-54 expansion	705,900
1954-55 sched. completions	267,800
Under construction, scheduled for completion July-December, 1955	92,000
TOTAL EXPANSION, 51-55	1,411,400
GRAND TOTAL in place & under construction 1/1/54	2,859,400
Covered by outstanding certificates of Necessity, not under const. 1/1/54	378,400
Available from byproduct and natural organics	265,000
PROPOSED TOTAL DOMESTIC SUPPLY, 1/1/57	3,502,800

Phosphates

P_2O_5 supplies for 1954-55 are forecast at 2.35 million tons: approximately the 1953-54 level; however, the industry has capacity to produce a considerably larger tonnage if required. Deliveries for 1953-54 were 2.364 million tons, 4 per cent over 1952-53.

The phosphate expansion goal provided for an in crease of 1.3 million tons P_2O_5 capacity over the 1951 production capacity of 2.25 million tons. The goal was not fully subscribed before being closed earlier this year.

The summary of present and proposed capacity includes:

		Capacity T/P_2O_5/Yr.
1951 base capacity		2,250,000
1952-55 exp. goal		1,300,000
1954-55 prod. goal		3,550,000
Total Capacity Subscribed under goal		
Normal super	166,600	
Triple Super	574,100	
Ammon. phosphate	105,900	
Nitraphosphates	161,900	
Other forms	138,800	
Total capacity completed under goal as of July 1, 1954		
Normal super	162,700	
Triple Super	507.800	
All other	143,000	
Total capacity under construction, 7/1/54		80,100
Total expansion in place and under const, 7/1/54		893,600
Total capacity of plants considered part of exp. program and not under construction 7/1/54		253,700

Construction under the goal is not expected to greatly exceed the 893,600 tons in place and under way as of July 1 because only a small part of the 253,700 tons not under construction is expected to be built.

Cash Receipts from Farm Marketing and Government Payments; Estimated Fertilizer Expenditures, 1952-53

(1,000 dollars)

Regions	Grand total farm receipts	Est. expenditures for fertilizer	% Fert. Expenditures of— total crop receipts and Govt. payments	% Fert. Expenditures of— Grand total farm receipts
New England	778,229	22,000	9.15	2.83
Middle Atlantic	2,622,832	101,000	13.47	3.85
South Atlantic	2,949,702	293,000	14.71	9.93
East North Central	5,992,866	247,000	12.35	4.12
West North Central	7,974,255	101,000	3.68	1.27
East South Central	2,064,178	157,000	12.85	7.61
West South Central	3,671,058	67,000	3.26	1.83
Mountain	2,297,345	22,000	2.06	.96
Pacific	3,573,485	112,000	5.09	3.13
U. S. TOTAL	31,923,950	1,122,000	7.86	3.51

Relation of Fertilizer Expenditures to Total Agricultural Production Expenses and to Farm Income in the Previous Year, 1911-53

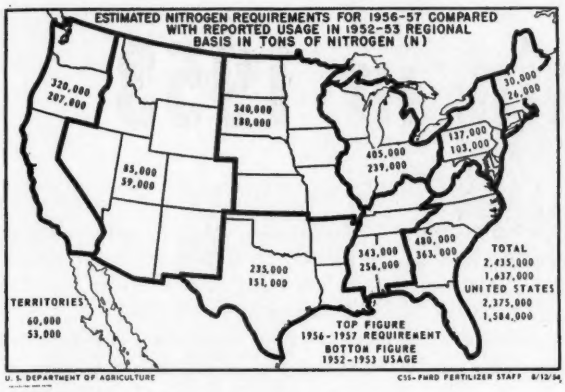
Calendar year	Total production expenses[1]	Cash income from crops and Government payments[2]	Expenditures for fertilizers: Amount	Portion of: Production expenses	Portion of: Previous year's income
	Million dollars	Million dollars	Million dollars	Per cent	Per cent
1911	3,646	2,925	159	4.4	5.4
1912	3,890	3,111	153	3.9	5.2
1913	4,035	3,095	172	4.3	5.5
1914	4,120	2,920	197	4.8	6.4
1915	4,223	3,280	159	3.8	5.4
1916	4,845	4,043	165	3.4	5.0
1917	6,136	5,660	218	3.6	5.4
1918	7,558	6,985	297	3.9	5.2
1919	8,461	7,674	326	3.9	4.7
1920	9,130	6,654	359	3.9	4.7
1921	6,875	4,199	203	3.0	3.1
1922	6,826	4,321	193	2.8	4.6
1923	7,125	4,885	200	2.8	4.6
1924	7,495	5,415	210	2.8	4.3
1925	7,464	5,526	229	3.1	4.2
1926	7,505	4,889	227	3.0	4.1
1927	7,545	5,157	205	2.7	4.2
1928	7,855	5,044	267	3.4	5.2
1929	7,780	5,125	268	3.4	5.3
1930	7,059	3,840	264	3.7	5.2
1931	5,634	2,536	184	3.3	4.8
1932	4,574	1,997	113	2.5	4.5
1933	4,374	2,604	118	2.7	5.9
1934	4,727	3,450	141	3.0	5.4
1935	5,111	3,551	160	3.1	4.6
1936	5,581	3,938	160	2.9	4.5
1937	6,126	4,315	208	3.4	5.3
1938	5,744	3,672	182	3.2	4.2
1939	6,088	4,173	218	3.6	5.9
1940	6,484	4,237	223	3.4	5.3
1941	7,469	5,302	250	3.3	5.9
1942	9,465	7,028	301	3.2	5.7
1943	10,882	8,652	373	3.4	5.3
1944	11,640	9,842	400	3.4	4.6
1945	12,629	10,307	440	3.5	4.5
1946	14,238	11,937	521	3.7	5.1
1947	16,849	13,910	581	3.4	4.9
1948	18,545	13,725	655	3.5	4.7
1949	18,038	12,922	698	3.9	5.1
1950	20,024	12,858	744	3.7	5.8
1951	22,000	13,473	951	4.3	7.4
1952	23,027	14,294	1,052	4.6	7.8
1953[3]	22,218	14,010	1,110	5.0	7.8

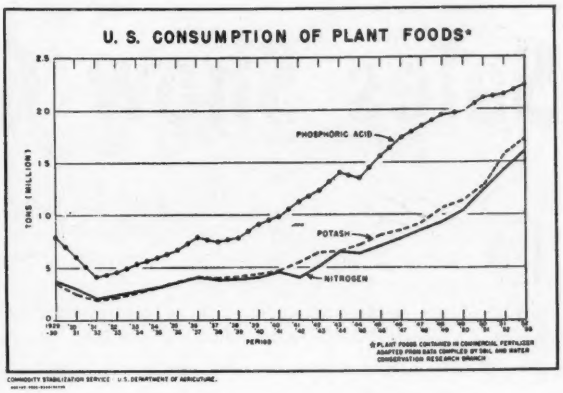
[1] Includes livestock industry. [2] Excludes livestock industry. [3] Preliminary.

Potash

The 1954-55 K_2O supply for fertilizer is estimated at 1.97 million tons, an increase of about 7.6 per cent over 1953-54. A production goal of two million tons represents an expansion of 600,000 tons over the Jan. 1, 1951 production capacity.

The goal was met ahead of schedule without tax amortization assistance and industry improvements during 1953-54 to provide a capacity in excess of two million tons. ◆





Control Officials Plan Annual Meetings

AGRICULTURAL control officials are scheduled to hold their annual meetings at the Shoreham Hotel in Washington, D. C., on October 11–16. Affairs will begin with the official meeting of the Association of Official Agricultural Chemists, Oct. 11–13th.

On the 15th, following an address by President Henry A. Davis, members of the Association of American Fertilizer Control Officials will hear Dr. Russell Coleman, NFA president, and Paul T. Truitt, APFC head. John D. Conner, attorney for National Agricultural Chemicals Association will address the group on "Warning and Caution Statements."

A long awaited report on "Non-Farm Consumption of Fertilizers" by USDA's Walter Scholl and Hilda M. Wallace will also be presented at the morning session along with papers on "Fertilizer Placement" by Dr. W. L. Nelson, North Carolina State College and "Public Relations" by Rodney C. Berry, Virginia state chemist.

Investigators' Reports

Reports of investigators to be delivered during the afternoon session include: General Terms, M. H. Snyder; Nitrogen Products (organic), M. P. Etheredge; Nitrogen Products (Inorganic), J. W. Kuzmeski; Phosphorus, J. F. Fudge; Potash, R. W. Ludwick; Calcium, Magnesium and Manganese, J. B. Smith; Boron, Rodney C. Berry; Zinc & Copper, Gordon Hart; Mixing & Segregation, M. B. Rowe; Registration Forms, John L. Monoghan; Publications, W. S. Thompson; Specimen Labels, F. W. Quackenbush; Tonnage Reports, Parks A. Yeats; Pesticides in Fertilizers, A. B. Lemmon; and Specialty Fertilizers, E. A. Epps, Jr.

S. B. Randle will report on the Model State Fertilizer Bill; J. H. Fisher, States Relations committee and J. D. Patterson, Executive committee.

Following reports of the Auditing, Resolutions and Nominating committees, officers will be elected for the coming year and a Presidential Plaque will be presented to Henry A. Davis.

Banquets honoring AAFCO members will be held on Thursday evening with NFA as host and on Friday by APFC.

AEPCO Meetings

Although formal meetings are scheduled for Oct. 16 by the Association of Economic Poisons Control Officials, an informal gathering will be held the preceeding evening. Floyd Roberts, retiring president, will make his report during the open session of the regular meeting, and speakers will include Philip J. Spear, National Pest Control Operators Association, and Dr. M. R. Clarkson, Agricultural Research Service.

Reports of technical committees will follow during the afternoon session along with election of officers. Plans have been made to honor the retiring president and past heads of the AEPCO with memorial plaques.

Among papers scheduled to be presented at a general scientific session on the 12th is one by Dr. E. L. Griffin, AOAC president, on recently developed pesticides and regulatory laws affecting their use.

Two talks on soil conditioners will be delivered, one by S. J. Toth, Rutgers University, on effectiveness of such materials and another by F. J. Roth, State of California, on methods of analysis. ◆

Phosphate Rock Production, Sales Show Gain in 1953

DOMESTIC mine production of phosphate rock ore in 1953 totaled more than 40 million long tons, according to reports by producers to the Bureau of Mines. The total marketable production rose 4 per cent in 1953, with increases registered in all three producing areas—17 per cent in the western states, 5 per cent in Tennessee and 1 per cent in Florida. Total stocks in producers' hands were slightly less in 1953 than in 1952.

Phosphate rock sold or used by

World Production of Phosphate Rock by Countries[1], 1944–48 (average), and 1949–54 in metric tons[2]

Country[1]	1949	1950	1951	1952	1953
North America:					
Canada	18	117	5	—	998
United States	9,019,957	11,292,541	10,947,971	12,258,534	12,704,516
West Indies:					
Netherlands Antilles[9]	92,784	104,240	107,144	106,902	96,035
South America:					
Brazil (apatite)	4,553	13,850	(3)	17,959	(3)
Chile (apatite)	49,311	13,437	37,182	26,417	[4]50,000
Europe:					
Belgium	44,643	50,846	129,065	58,983	35,896
France	59,643	73,752	110,000	102,000	73,000
Ireland	(3)	[4,5]29,000	[4,5]25,000	(3)	(3)
Spain	23,093	24,080	22,830	23,474	21,862
Sweden (apatite)	1,604	2,044	9,013	21,422	(3)
U.S.S.R. (apatite)[4]	2,540,000	2,540,000	2,794,000	3,000,000	3,000,000
Asia:					
British Borneo (guano)	508	653	659	707	642
China[4]	20,000	20,000	20,000	20,000	30,000
Christmas Island (Indian Ocean)[9]	255,236	320,423	338,693	354,762	284,689
India (apatite)	588	3,074	423	452	(3)
Indonesia	[4]5,000	[4]5,000	—	—	828
Israel	—	—	[6]297	17,200	23,092
Japan	684	258	143	—	—
Jordan[9]	—	—	6,635	24,941	28,700
Korea	(3)	(3)	(3)	(3)	(3)
Philippines (guano)	10,998	32,606	4,821	4,231	640
Africa:					
Algeria	648,202	684,657	776,575	702,587	602,753
Angola (guano)	(3)	1,033	943	—	—
British Somaliland (guano)[9]	580	308	691	(3)	(3)
Egypt	350,480	397,207	499,976	522,214	484,176
French Morocco	3,692,958	3,872,241	4,716,800	3,953,100	4,156,000
French West Africa (aluminum phosphate)	5,675	11,909	24,500	43,150	52,400
Madagascar	—	—	—	1,305	1,556
Seychelles Islands[9]	14,171	10,005	4,547	11,120	8,859
S. Rhodesia	67	36	—	—	—
South-West Africa (guano)	957	581	785	1,675	1,604
Tanganyika Territory	130	468	459	169	151
Tunisia	1,441,918	1,524,833	1,678,905	2,264,641	1,718,530
Uganda	—	467	2,242	5,010	5,448
Union of South Africa	56,471	51,844	81,840	96,568	80,125
Oceania:					
Angaur Island	157,049	[4]137,000	[9]144,843	[9]83,905	[4,9]112,524
Australia	11	1,653	8,056	5,623	(3)
Makatea Island (French Oceania)[9]	265,082	270,300	227,858	213,555	250,511
Nauru Island[9]	802,070	1,070,358	942,945	1,164,038	1,178,364
Ocean Island[9]	265,087	251,218	256,451	249,542	286,894
Total (estimate)	19,850,000	22,800,000	24,000,000	25,500,000	25,500,000

[1] In addition to countries listed, Poland may produce phosphate rock; but data of output are not available, and no estimate by the author of the chapter has been included in the total. [2] This table incorporates a number of revisions of data published in previous phosphate rock chapters. [3] Data not available; estimate by author of chapter included in total. [4] Estimate. [5] Year ended June 30 of year stated. [6] Production started second-half of December 1951. [7] Average for 1947–48. [8] Average for 1946–48. [9] Exports.

Another
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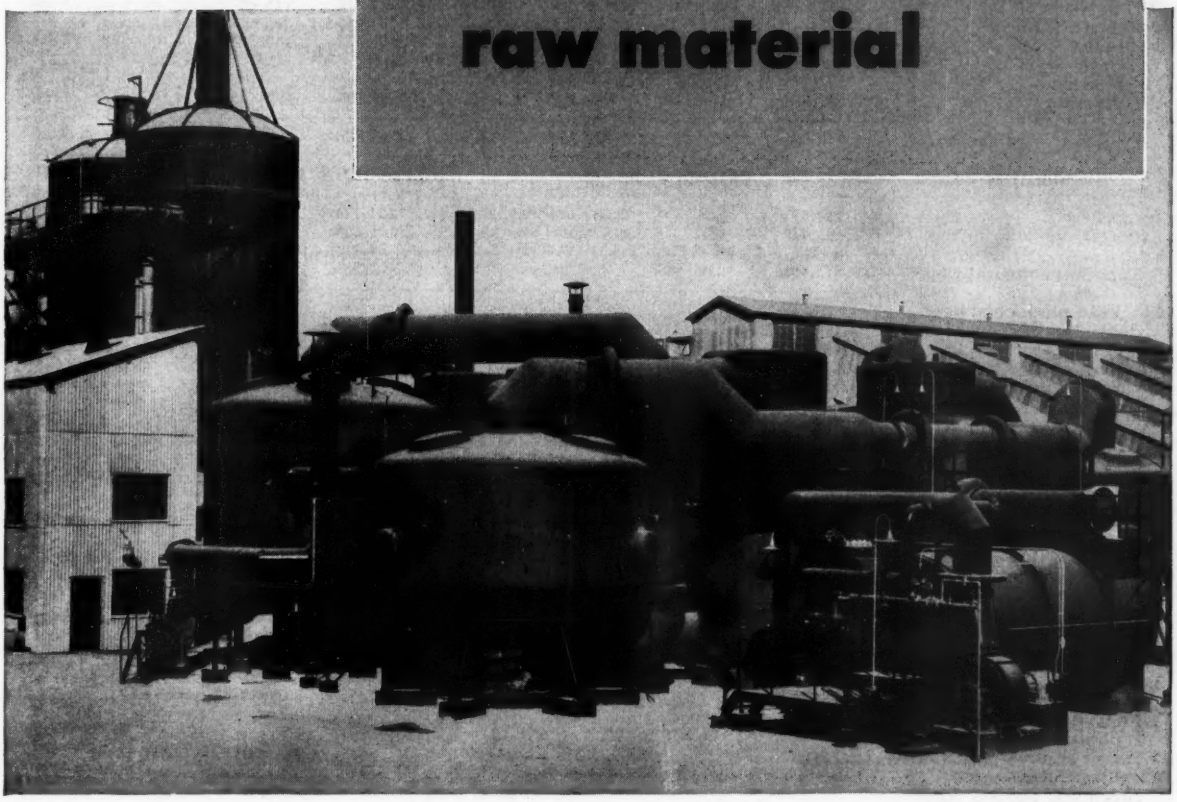
achievement

H_2SO_4 from an unusual raw material



By the completion of the 450 ton-acid plant for the Anaconda Copper Company at Weed Heights, Nevada, Chemico has added another unusual raw material to the list of materials from which Chemico plants produce sulfuric acid. Low grade ores containing 25 to 30 per cent uncombined sulfur are roasted in Dorr FluoSolids reactors to produce strong sulfur dioxide which is cooled, purified and processed into fresh acid of high strength. The plant has unusual features of design that permit it to operate at 150 tons or at 500 tons per day capacity with equal efficiency. • If your problem relates to sulfuric acid manufacture, concentration or recovery, Chemico can help you.

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- *Waste Smelter Gases*
- *Sulfur Dioxide*
- *Refinery Acid Sludge*
- *Spent Alkylation Acid*
- *Pickling Liquor*

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Chemico plants are profitable investments

Salient Statistics of the Phosphate Rock Industry in the United States, 1952–53

	1952				1953			
	Long tons		Value at mines		Long tons		Value at mines	
	Rock	P_2O_5 content	Total	Average	Rock	P_2O_5 content	Total	Average
Mine production	[1]32,800,000	(2)	(2)	(2)	40,139,000	5,102,000	(2)	(2)
Marketable production[3]	[4]12,064,892	[4]3,870,333	(2)	(2)	12,503,830	3,987,412	(2)	(2)
Sold or used by producers								
Florida:								
Land pebble	8,624,186	2,901,008	$50,483,421	$5.85	9,009,220	3,029,215	$54,498,217	$6.05
Soft rock	75,853	15,358	433,203	5.71	75,910	15,565	470,062	6.19
Hard rock	81,086	28,575	625,175	7.71	81,725	28,800	643,993	7.88
Total Florida	8,781,125	2,944,941	51,541,799	5.87	9,166,855	3,073,580	55,612,272	6.07
Tennessee	1,452,508	386,039	10,874,760	7.49	1,622,170	428,687	12,251,117	7.55
Western States:								
Idaho	620,551	172,532	2,163,608	3.49	[1,070,773	280,758	4,090,599	3.82
Utah					(5)	(5)	(5)	(5)
Montana	332,299	95,793	2,620,764	7.89				
Wyoming	137,675	44,114	919,987	6.68	658,125	191,825	4,643,087	7.06
Total Western States	1,090,525	312,439	5,704,359	5.23	1,728,898	472,583	8,733,686	5.05
Total United States	11,324,158	3,642,419	68,120,918	6.02	12,517,923	3,974,850	76,597,075	6.12
Imports	[4]110,197	(2)	[4,6]2,332,444	[4,6]21.17	101,171	(2)	[6]2,545,081	[6]25.16
Exports[7]	1,401,949	(2)	8,878,393	6.33	2,061,329	(2)	13,254,906	6.43
Apparent consumption[8]	[4]10,032,406	(2)	—	—	10,557,765	(2)	—	—
Stocks in producers' hands December 31:[7]								
Florida	[4]1,438,000	[4]475,000	(2)	(2)	1,602,000	534,000	(2)	(2)
Tennessee[9]	[4]531,000	[4]146,000	(2)	(2)	428,000	116,000	(2)	(2)
Western States	[4]569,000	[4]152,000	(2)	(2)	494,000	135,000	(2)	(2)
Total stocks	[4]2,538,000	[4]773,000	(2)	(2)	2,524,000	785,000	(2)	(2)

[1] Estimated figure. [2] Data not available [3] See table 2 for kind of material produced. [4] Revised figure. [5] Included with Montana and Wyoming. [6] Market value (price) at port of shipment and time of exportation to the United States. [7] As reported to the Bureau of Mines by domestic producers. [8] Quantity sold or used by producers plus imports minus exports. [9] Includes a small quantity of washer-grade ore (matrix).

Phosphate Rock Sold or Used by Producers in the United States, 1952–53, by Uses and States

Uses	Florida	Tennessee	Western States	Total United States	
	Long tons	Long tons	Long tons	Long tons	Percent of total
	1952				
Domestic:					
Superphosphates	5,953,922	249,902	291,097	6,494,921	57
Phosphates, phosphoric acid, phosphorus, ferrophosphorus	620,127	925,941	478,138	2,024,206	18
Direct application to soil	866,329	237,786	101,878	1,205,993	11
Fertilizer filler	363	15,374	—	15,737	(1)
Stock and poultry feed	157,286	21,680	220	179,186	2
Undistributed[2]	341	1,825	—	2,166	(1)
Exports[3]	1,182,757	—	219,192	1,401,949	12
Total	8,781,125	1,452,508	1,090,525	11,324,158	100
	1953				
Domestic:					
Agricultural:					
Ordinary superphosphate	4,868,828	79,844	95,510	5,044,182	41
Triplesuperphosphate	927,701	62,376	164,460	1,154,537	9
Nitraphosphate	2,820	—	—	2,820	(1)
Direct application to soil	[4]732,984	191,440	101,902	1,026,326	8
Stock and poultry feed	139,362	21,365	357	161,084	1
Fertilizer filler	(4)	13,157	—	13,157	(1)
Other fertilizers[5]	—	54,876	1,340	56,216	(1)
Total agricultural	6,671,695	423,058	363,569	7,458,322	60
Industrial:					
Elemental phosphorus, ferrophosphorus, phosphoric acid	397,916	1,197,417	1,064,124	2,659,457	21
Phosphoric acid (wet process)	302,566	—	30,334	332,900	3
Undistributed[2]	—	1,695	4,220	5,915	(1)
Total industrial	700,482	1,199,112	1,098,678	2,998,272	24
Exports[3]	1,794,678	—	266,651	2,061,329	16
GRAND TOTAL	9,166,855	1,622,170	1,728,898	12,517,923	100

[1] Less than 0.5 per cent. [2] Includes phosphate rock used in pig-iron blast furnaces, parting compounds, research, defluorinated phosphate rock, refractories and other uses. [3] As reported to the Bureau of Mines by domestic producers. [4] Direct application to soil includes fertilizer filler. [5] Includes phosphate rock used in calcium metaphosphate, fused tricalcium phosphate, Rhenania type phosphate and other uses.

producers in the United States was more than 10 per cent above the 1952 figure. The western states showed the largest increase, 59 per cent, followed by Tennessee with 12 per cent and Florida with 4 per cent. Total and average value also were higher.

Imports were 8 per cent below 1952, whereas exports were 47 per cent above 1952. The apparent domestic consumption again set a new record, rising more than 5 per cent above 1952 and more than 119 per cent above 1943.

Phosphate rock sold or used, by uses, has been revised to give more detail than was available in previous years. In order to avoid duplication only the quantity of raw phosphate rock used to manufacture the listed products is shown. For example, the figure shown for the phosphate rock sold or used in the manufacture of triple superphosphate in 1953 (1, 154, 537) does not include the phosphate rock sold or used to make the phosphoric acid subsequently used in manufacture of this fertilizer. ◆

From "Phosphate Rock Industry of the United States in 1953," MMS No. 2318, U. S. Department of the Interior, Bureau of Mines,

Phosphate Rock Sold or Used by Producers in the United States, 1944–48 (average) and 1949–53

Year	Long tons	Value at mines	
		Total	Average
1944-48 (average)	7,147,976	$34,598,352	$4.84
1949	8,986,933	51,415,027	5.72
1950	10,253,552	59,027,848	5.76
1951	11,095,204	66,158,078	5.96
1952	11,324,158	68,120,918	6.02
1953	12,517,923	76,597,075	6.12

Apparent Consumption[1] of Phosphate Rock in the United States, 1944-48 (average) and 1949-53, in long tons.

Year	Long tons
1944-48 (average)	6,373,392
1949	7,735,005
1950	8,580,925
1951	9,511,545
1952	10,032,406[2]
1953	10,557,765

[1] Quantity sold or used by producers plus imports minus exports.
[2] Revised figure.

Jacob Reports on Fert-Pest Mixtures

USDA's K. D. Jacob cited 1952-53 consumption figures in a recent address to show the increased interest now evident in fertilizer-pesticide mixtures. In a talk before members of the National Joint Committee on Fertilizer Application and the American Society for Horticultural Science at Gainesville, Fla., Jacob said that incomplete data showed consumption of these mixtures at 87,000 tons, with greatest use in the South Atlantic, which accounted for 69 per cent of the total in 1952-53.

He compared the present situation in which fertilizer manufacturers register a minimum of enthusiasm over fertilizer-pesticide mixtures to the situation in the feed industry when drugs and antibiotics in therapeutic amounts were first incorporated in mixed feeds.

Careful Investigation

Compatibility and stability of each new pesticide should be carefully investigated, Jacob warned, and until this is accomplished mixers might well limit operations to better known materials or prepare mixes just prior to shipment.

Correspondence with 40 companies indicates that the problem of uniform mixing caused trouble for about 25 per cent of the reporting concerns. The lack of difficulty experienced by the others appears to be based mostly on the absence of complaints. Health problems were also considered—the probability of an increase in compensation insurance rates for fertilizer-pesticide mixers and dust abatement are two major factors.

Jacob indicated that greater care should be given to future tests of such mixtures and also considered economic problems. Prices were said to range (basis 100 per cent technical when mixed with fertilizers) from $2.00-3.25/pound for aldrin; $1.00-1.88 for chlordane; $.50-.70 for DDT. In some cases there is no charge for mixing, others demand from $1.00 to $10.00 per ton. He indicated that the higher cost of mixtures over straight fertilizer may tempt some farmers to reduce fertilizer application rates below levels otherwise used.

Agronomic Problems

Among agronomic problems involved, the USDA researcher pointed out that the greatest danger of adverse effects on vegetation would come with row or hill application, but that the reverse would be true of overall effects on micro-organisms.

Pesticide forms presently marketed for mixing include both dustless and nondustless powders, granular products with particle size range of 30 to 60 mesh, solutions in low viscosity solvents and emulsion concentrates. Powdered products appear to be most widely used. With the trend in favor of granular fertilizers it may be expected that increased use will be made of insecticide solutions in low viscosity solvents for spray application to fertilizer granules.

Pesticides are usually added to cured fertilizer in a separate operation just prior to bagging or loading for shipment in fertilizer mixing equipment with a several fold increase in mixing time. Most plants prepare mixes only on specific request.

It appears that solid mixes were manufactured by at least 113 companies in 1953-54, as compared to a gross total of 95 in 1952-53. ◆

NSC Fertilizer Section

"Stump the Experts" Sessions Featured on Chicago Program

FERTILIZER manufacturers attending the 42nd National Safety Congress and Exposition in Chicago on October 18–22 will find an excellent program prepared for them by NSC's fast moving Fertilizer section.

Under the direction of Chairman Vernon Gornto, Smith-Douglass co., the section has obtained a number of capable speakers for the fertilizer sessions taking place on the first two days of the congress, topping each meeting with a "Stump the Experts" program.

Dr. Chas. W. Nelson, director, research & planning, Industrial Relations Center, University of Chicago, who is directing the section's workman's motivation

Gornto

Nelson

Creel

study, will address the group on the 18th, outlining the importance of knowing behavior patterns and motivational influences of the worker you wish to reach with any program.

Following Nelson will be popular W. C. (Billy) Creel, North Carolina's safety director, who has developed and administered the first formal state-wide safety program devoted exclusively to problems of small fertilizer plants. Creel will discuss "A Small Plant Safety Program that will Work."

A number of visual aids have been devised by a section committee, all of which can be used to pep up safety meetings and to train both employees and foremen. R. R. Murray, safety director, Swift and co., will describe their use in the small plant program.

Other addresses include a report by General Chairman Gornto and a report of the Nominating committee by John E. Smith, director of safety, Spencer Chemical co. Election of officers for 1954–55 will also be held.

Completing the first day's program will be a "Stump the Experts" symposium led by Tom J. Clarke, personnel director, GLF Soil Building Service. Members of the panel and their subjects will include: Maintenance Hazards, W. A. Stone, superintendent, Wilson & Toomer Fertilizer co.; Fertilizer-Insecticide Mixtures, Curtis A. Cox, assistant manager, Manufacturing dept., Virginia Carolina Chem. corp.; Minimum Medical Program, W. E. Powell, Liberty Mutual Insurance co.; Dynamite, W. H. Henderson, Coop. Plant Foods, Inc.; Blasting Problems, D. A. Williams, TV Fertilizer plant; Liquid Nitrogen, Elmo C. Perrine, Nitrogen div.; Interesting Foremen and Safety, John Marx, Iowa Farm Supply co.; Ideas About Safety Equipment, J. D. Acree, Crawford Chem. co. and Reaching the Worker, Allan Brent, Southern Fert. & Chem. co.

On the 19th, following remarks by the new general chairman, R. J. Rhinehart, Arkansas Power & Light co., will speak on "The Job Ahead." According to the Fertilizer section's public relations chairman, J. Lauren Shopen, Consumers Coop. Assn., Rhinehart will have many interesting observations on human relations.

A gadget display by John Miskelly, Mathieson Chem. co., will be a dramatic exposition of common hazards with suggested corrections. One more address is scheduled for this session but the name of the speaker and his subject were not available at press time.

Another "Stump the Experts" session, directed by Tom Clarke, will complete the program. For this symposium, speakers and subjects include: Anhydrous Ammonia, J. S. McKenna, Lion Oil co.; Plant-Wide Safety Contests, A. E. Johnson, Illinois Farm Supply co.; Triple Superphosphate & Acid Handling, Duncan McDonald, Anaconda Copper Mining co.; Phosphate Mining, B. J. Phillips, Coronet Phosphate co.; Tractor & Tractor Shovel Operation, M. H. Talbott, Kingsbury & co.; Conveyors, R. G. Diserens, Phillips Chem. co. and Housekeeping, G. B. Morris, Coop. Fert. Service.

Murray

Clarke

Rhinehart

Both programs are afternoon affairs scheduled to take place in the Lincoln room on the 18th floor of the LaSalle Hotel.

The exposition will include 238 display booths and is termed the largest and most comprehensive display of accident prevention equipment to date. ◆

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ACS Papers Abstracted

Cover Use of Surfactants in Fertilizers; Pesticide Residues

Scores of papers covering a diversity of subject matter were presented at the 126th meeting of the American Chemical Society on September 12-17 in New York City. A new record attendance mark of 13,514 registrants was set. Due to space limitations FARM CHEMICALS is able to select only a portion of the papers presented.

Div. of Fert. & Soil Chemistry

Colorimetric Determination of Biuret. G. C. Ellis and R. L. Formaini, Nitrogen div., Allied Chemical and Dye corp., Hopewell, Va.

Biuret, an analog of urea, may be prepared from urea, and is of potential importance in agriculture as a combined herbicide-fertilizer.

No well defined method of analysis for biuret was found in the literature. Analysis by formation of copper-biuret complex by adding 0.06*M* copper sulfate solution to alkaline solutions of biuret, followed by filtration to remove precipitated hydrous copper oxide and measurement of color, was unsatisfactory for samples containing large amounts of biuret. Erratic results were attributed to sorption of the colored complex by the hydrous copper oxide and peptization of the hydrous copper oxide.

The method developed is applicable to samples containing large or small amounts of biuret. Alkaline sodium potassium tartarate is added to an aqueous solution of the samples; addition of 0.055*M* copper sulfate solution follows. After an aging period under controlled conditions, light absorption measurements in the 500 to 570μ range are made. Biuret is determined by reference to a calibration curve.

Sorption of Surface Active Agents from Aqueous Solution by Phosphate Rock. E. J. Fox and W. A. Jackson, Agricultural Research Service, USDA, Beltsville, Md.

In a previous study of the influence of anionic and nonionic types of surface active agents on phosphate rock acidulation the results obtained indicated the presence of some factor in double-floated rock. An extension of this study has been made to determine whether the differences in rock behavior might be due to the presence of a cationic flotation agent in the floated rock.

In preliminary tests, surface tension measurements on aqueous and acetone extracts of double-floated phosphate rock failed to indicate the presence of the cationic flotation agent in the rock sample. But, when phosphate rock was suspended in aqueous solutions of surface active agents, surface tension measurements on filtered portions of the solution also showed that the surface active agents were completely removed from solution by sorption on the suspended rock particle. Examination of the sorption phenomena showed that anionic, nonionic and cationic surfactants were sorbed in varying degrees from variable concentrations of aqueous solution depending upon the type and molecular weight of the surfactants.

A comparison of the sorptive capacity of floated and non-floated rock for various types of surfactants showed that the double-floated rock had a greater sorptive capacity for the anionic, and less capacity for the cationic type of surfactant than the non-floated rock. Non-floated rocks from various sources had sorptive capacities of the same order of magnitude for the several types of surfactants.

Effect of Particle Size Upon the Ammoniation of Superphosphate. Charles E. Waters, Willard W. Arnold and William H. Payne, Nitrogen div., Allied Chemical & Dye corp., Hopewell, Va.

In present-day manufacture of mixed fertilizers, ammoniation rates are often so high that the limiting factor is the ability of the superphosphate to absorb ammonia. One would expect fine superphosphate to absorb ammonia more readily than coarse, but recent published data on absorption from nitrogen solutions are lacking.

This paper describes a laboratory study using procedures that simulated commercial operation. Mixtures of normal superphosphate, muriate of potash and sand were ammoniated with a nitrogen solution containing 65 per cent ammonium nitrate and 21.7 per cent ammonia. Absorption efficiency was judged by the disappearance of ammonia from the air in the ammoniator, and by the nitrogen content of the fertilizer. A preliminary series of experiments showed a definite effect of particle size upon ammonia absorption.

Another superphosphate was then screened into seven fractions, which were adjusted to comparable moisture contents before ammoniation. At a rate of 7.17 pounds of ammonia (in the solution) per unit of phosphorus pentoxide, even the finest fraction left almost 0.5 per cent of ammonia in the air at the end of three minutes. At the 5.13 pound rate, the 40 to 50 mesh fraction reduced the concentration of ammonia to zero in three minutes. At the 4.13 pound rate, the 16 to 30 fraction reduced it to zero in two minutes.

The paper includes some data on the distribution of phosphorus pentoxide among the fractions, and on the relation between moisture content and apparent free acid. Availabilities of phosphorus pentoxide were not determined.

Pilot-Plant Production of Diammonium Phosphate Fertilizer from Wet Process Phosphoric Acid. E. C. Houston and L. D. Yates, Tennessee Valley Authority, Wilson Dam, Ala.

Pilot-plant development is described for a process for making diammonium phosphate fertilizer from ammonia and wet-process phosphoric acid. The process involves ammoniation of the acid, filtering off the resulting precipitate of ron and aluminum phosphates, and

feeding the filtrate and additional ammonia to a continuous vacuum crystallizer where diammonium phosphate is crystallized. After centrifuging, the crystals are mixed with the filter cake and dried, yielding a granular fertilizer containing about 18 per cent N and 47 per cent P_2O_5.

If desired, potassium chloride, ammonium nitrate and superphosphate can be added to the undried mixture of crystals and filter cake to produce, on drying, a variety of grades of granulated fertilizers such as 18–18–18 or 7–28–28.

A major portion of the work was concerned with developing satisfactory conditions for the precipitation step and for crystallizing diammonium phosphate in the system ammonia-phosphoric acid-sulfuric acid-water.

The Manufacture and Properties of Liquid Fertilizers. Peter G. Arvan and Robert P. Langguth, Inorganic Chemicals div., Monsanto Chemical co., Dayton, O

Information has been developed concerning the raw materials, composition and methods of manufacture of several different base-ratio liquid fertilizer formulations. Data on their crystallization temperatures, PH values and densities have been obtained.

The liquid fertilizers discussed contain the primary plant nutrients completely dissolved in water. The nutrients are generally derived from combinations of several of the following raw materials: phosphoric acid, monoammonium phosphate, diammonium phosphate, anhydrous or aqueous ammonia, urea, ammonium nitrate, ammonia-ammonium nitrate liquors, ammonia-urea liquors and potassium chloride. The composition of these liquid formulations is adjusted to obtain complete solubility of the nutrient sources, not only at room temperatures but also as temperatures near freezing (32° F), and PH values near neutral (6.0 to 8.0). Densities of such solutions usually vary between 9.5 and 10.5 pounds per gallon.

Liquid fertilizers may be manufactured either by the dissolution of solid-form nutrient sources in water or by the ammoniation of furnace-grade phosphoric acid. Data obtained in a pilot-plant operation have demonstrated that low cost capital equipment can be successfully employed in the manufacture of liquid fertilizers.

Some Effects of Surface Active Agents in Mixed Fertilizers. Rikio Kumagai and John O. Hardesty, Agricultural Research Service, USDA, Beltsville, Md.

Laboratory studies have shown that various surfactants have limited but specific effects on density and ammonia absorption efficiency of superphosphates and on caking tendency of mixed fertilizers.

Ammonium Nitrate Hazards

ANOTHER paper of special interest to farm chemicals manufacturers was presented by R. M. Hainer and W. C. Lothrop, both of Arthur D. Little, Inc. on the "Thermal Hazard in Ammonium Nitrate and High-Percentage Ammonium Nitrate Materials." The researchers had investigated the causes of the Texas City disaster and 25 major fires and explosions which occurred during the past 40 years.

Dr. Hainer explained that in a fire ammonium nitrate decomposes giving off large amounts of heat and gas but, although there have been warehouse fires involving large quantities of AN, it has only exploded in ships. It was felt that an unexplained factor was involved which limited the chemical reaction outside of ships.

The answer was found to be that at constant pressure, a reaction takes place in which AN disassociates into gaseous ammonia and nitric acid, a reaction that absorbs heat and limits the temperature rise caused by the fire so that explosion temperature is not reached.

If the pressure is high the controlling reaction is prevented and an explosion can result. It was reasoned that from the fire within the mass of 40,000 bags of AN stored in the S. S. Grandcamp's hold at Texas City, sufficient pressure for the products of decomposition developed locally to produce an explosion touching off the entire cargo.

It was also shown in the paper by Hainer and Lothrop that spontaneous combustion at excessive temperature can cause a fire in fertilizer grade AN. Under ordinary conditions of good housekeeping and use, Hainer assured farmers, it will not ignite or explode spontaneously.

Uncontrolled acceleration in decomposition at normal applied pressure, Hainer stated, is limited by a dissociative, heat-absorbing vaporization. For an applied pressure of one atmosphere. the temperature of reacting AN in the condensed phase is limited to about 292° C. Even in the presence of gas-phase flame and burning fuel, the temperature of decomposing condensed phase AN is limited to near 300° C.

Explosive rates of reaction do not occur below temperatures of the order of 450° C and such temperatures are not possible without external pressures of above 20 atmospheres.

Evaporation is always evidenced by the release of copious white fumes when AN is heated to above 270° C.

The tests and research were sponsored by the U. S. Coast Guard and resulted in improved shipping instructions for ammonium nitrate under which all types of AN can be shipped anywhere with a complete understanding of the hazards involved.

Investigation of cured superphosphates which have been treated with 0.75 pound per ton of surfactant at acidulation time showed that those treated with nonionic types had appreciably lower bulk densities than those treated with anionic types. Ammonia absorption efficiencies of the treated superphosphates irrespective of the type of surfactant used were generally from 2 to 6 per cent higher than those of the untreated superphosphates. Absorption efficiencies of the untreated superphosphates ranged from 82 to 87 per cent. Laboratory caking tests on 10–10–10 and 11–23–11 mixed fertilizer containing these superphosphates showed that nonionic surfactants produced slight but significant (1 per cent level of significance) reductions in caking tendencies of the mixture.

Anionic and nonionic surfactants added to cured superphosphates during the mixing process produced increases in ammonia absorption efficiencies of from 2 to 5 per cent. Doubling the amounts of surfactants caused no further increases. Under similar conditions, anhydrous sodium tripolyphosphate and magnesium sulfate heptahydrate increased the absorption efficiency of superphosphate as much as 5.5 per cent when added at the rate of five pounds per ton. Analysis of ammoniated superphosphates stored for 30 days showed that surfactants had no effect on water-soluble or citrate-insoluble phosphorus pentoxide contents.

In general, surfactants added at acidulation time had greater effect on ammonia absorption of superphosphates and caking tendency of mixed fertilizers than surfactants added during mixing process.

Drying of Ammoniated Superphosphates and Mixed Fertilizers. G. L. Bridger and H. A. Burzlaff, Iowa State College, Ames, Iowa.

Laboratory experiments were carried out on drying of ammoniated superphosphates and mixed fertilizers. Both storage-cured and quick-cured superphosphate were used for ammoniation. Various sources of nitrogen were used, including aqueous ammonia, ammonium

nitrate, ammonium sulfate and ammoniating solutions. Drying was carried out at various temperatures in a laboratory Roto-Louvre dryer.

When ammoniated superphosphate prepared with aqueous ammonia at an ammoniation rate of five pounds of ammonia per unit of P_2O_5 nitrogen loss during drying became appreciable at product temperatures in the range 200° to 230° F at inlet air temperatures of 300° to 600° F. Product temperature has a much greater effect on nitrogen loss than inlet air temperature. When potassium chloride was added, nitrogen loss became appreciable at lower product and inlet air temperatures. Quick-cured superphosphate was as satisfactory for ammoniation as storage-cured superphosphate.

The results point to the importance of careful choice of drying temperatures for mixed fertilizers prepared in various ways. Nitrogen losses of 15 to 20 per cent were encountered under some conditions but these can be avoided by use of proper drying temperatures.

Evaluation of Surfactants for Use in Fertilizer Manufacture. F. A. Retzke, G. F. Sachsel and R. B. Filbert, Jr., Battelle Memorial Institute, Columbus, O.

Thirty-two commercial surfactants were screened in the laboratory. Tests for foaming, surface tension and stability in acid and alkaline solution reduced the number of promising materials to 16. Two of the cheapest products from the screened group were tested on a production scale in manufacture of normal superphosphate and mixed fertilizer. No significant reduction in caking of the mixed fertilizer was observed. The mixed goods made with these surfactants were found to be less dusty than fertilizer containing a powdery silicate conditioner.

Some unusual effects were observed during the laboratory screening work which suggest that more work should be done toward establishing good screening methods for these materials.

A Plant Scale Controlled Experiment Using Surface Active Agents in Mixed Fertilizer Manufacture. William J. Tucker, G. L. F. Soil Building Service, Ithaca, N. Y.

This investigation was undertaken in an attempt to evaluate the worth of two liquid surfactants in their effects on the production of relatively large test batches (150 tons) of a mixed fertilizer, under plant conditions as nearly controlled as possible.

Two types of surfactants were used. The first, an anionic type, was a 37 to 39 per cent active aqueous solution of the sodium sulfate derivative of 2-ethyl-1-hexanol and the second, a nonionic, was a 95 per cent active alkyl phenyl polyethylene glycol ether.

Tests were performed and observations recorded on replicate tiers of bags in storage for "short" and "long" time intervals. Effects noted in fertilizer which was cured for "short" and "long" periods of time prior to bagging were also recorded.

Evaluation of the data indicates that no beneficial effects were achieved by using the nonionic surfactant, and that the anionic used, on the other hand, showed consistent, temporary benefits. The magnitude and significance of these effects are discussed and form the basis for a decision concerning the continued use of surfactants by the company.

Div. of Ag & Food Chemistry

Spectrophotometric Analysis of Technical Chlordane and Technical Heptachlor Residues on Food and Forage Crops. Eugene P. Ordas, *Victor C. Smith* and Charles F. Meyer, Velsicol corp., Research Laboratories, Chicago, Ill.

The need for accurate methods for the specific analysis of micro quantities of chlordane or heptachlor possibly present on food and forage crops has led to the adoption of the two methods: the Davidow method for chlordane residues and the Polen-Silverman method for heptachlor residue. Modification of the reagents, solvents, equipment and clean-up techniques have made it possible to detect chlordane at 0.02 p.p.m. and heptachlor at 0.01 p.p.m. in samples ranging from 500 to 2200 grams in size.

Samples are ground and dried with anhydrous sodium sulfate and extracted in Soxhlet extractors with a purified *n*-pentane. Plant pigments, oils and waxes are separated by one of several techniques of chromatography, and the residue of the extract reacted with the color complex forming reagent. The toxicant concentration is determined by spectrophotometric measurement of the intensity of the color complex and by comparison of this intensity to the toxicant concentration taken from a standard calibration curve. Techniques to analyze 35 different crops have been developed.

The method has been used to provide toxicant persistence data in various media including crops and soil. The quantity of toxicant residue has been shown to be a function of the rate of application, and the time between application and harvest.

The Rate of Accumulation of DDT in Soils from Spray Practices. *Joseph M. Ginsburg,* New Jersey Agricultural Experiment Station, Rutgers University, New Brunswick, N. J.

As a result of the wide use of DDT for the control of various insect pests, there has been a growing concern over its possible accumulation in soils in sufficiently large quantities to become harmful to the growth of certain crops.

Chemical analyses of DDT in many soils from different crops, reported in this paper, indicate considerable variations in the rate of DDT accumulation. The total deposits of DDT in agricultural soils from spray practices will depend on many factors: crop, formulations, number of applications, methods of application, amount applied per acre of crop, cultivation practices, soil topography, climatic factors and others.

The possibility of accumulating large quantities of DDT in soils from spray residues appears more likely to occur in orchards, especially in apple orchards where from 25 to 40 pounds of actual DDT may be applied per acre each season, than in soils from field crops such as corn, or from vegetable crops such as potatoes. In general, the rate of DDT disappearance from soils is comparatively slow, lasting for a number of years.

Isopropyl N-(3-Chlorophenyl) Carbamate (CIPC) Residues in Various Crops. Leavitt N. Gard, *Blaine O. Pray* and Noland G. Rudd, Columbia-Southern Chemical corp., Barberton, O.

The analytical method of Gard and Rudd for determining micro quantities of isopropyl *N*-(3-chlorophenyl) carbamate in crops was applied to harvested crops of head lettuce, sugar beets (roots and foliage), onions, cotton seeds and peanuts grown in soil receiving preemergence treatment ranging between 2.5 and 8.0 pounds of the herbicide per acre. Residue analyses obtained from these crops are compared with analyses of crops grown in soil receiving no treatment.

Isopropyl *N*-(3-chlorophenyl) carbamate residues found in the harvested crops receiving treatment, after correction for interference, ranged from slightly negative values in the case of sugar beets and peanuts, to a maximum of 0.03 p.p.m. of isopropyl *N*-(3-chlorophenyl) carbamate in the case of head lettuce.

The Toxicity of Certain Chlorinated Hydrocarbon Insecticides with Special Reference to Aldrin and Dieldrin. *Joseph F. Treon* and Frank P. Cleveland, Department of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati, Cincinnati, O.

The immediate toxicity of four dimethanonaphthalenes (aldrin, isodrin, dieldrin and endrin), when compared

on the basis of their oral administration to rats or rabbits or as applied and maintained upon the skin of rabbits, depends more directly upon their spatial configuration than upon their empirical composition.

Repetitive applications of aldrin, dieldrin or DDT upon the skin of rabbits exerted toxic effects decreasingly, according to the type or use of a vehicle, in the following order: (1) in Ultrasene, (2) in a vegetable oil (aldrin and DDT in olive oil and dieldrin in peanut oil) and (3) as dry powders (no vehicle).

When fed over the period of two years to rats of either sex at levels of 2.5, 12.5 or 25.0 p.p.m., none of these insecticides (aldrin, dieldrin, DDT) appear to shorten the lives of the animals, the rate of mortality among the test groups being comparable statistically to that in corresponding control groups. The rates of growth of the test groups were equal to or in excess of that of the controls.

The weight of the livers of the test rats, in relation to their body weights, was somewhat on the high side.

Toxicity Study of a Grain Fumigant. *V. K. Rowe*, R. L. Hollingsworth and D. D. McCollister, Biochemical Research dept., Dow Chemical co., Midland, Mich.

Dowfume EB-5 is a fumigant mixture commonly used for the fumigation of grain in storage, consisting on a weight basis, of carbon tetrachloride, 63.6 per cent; ethylene dichloride, 29.2 per cent and ethylene dibromide, 7.2 per cent. Information was needed which would allow an evaluation of the hazard to health of the fumigator and to stock fed treated grain.

The administration of single oral doses to rats, guinea pigs, rabbits and chicks yielded LD_{50} values ranging from 280 mg. per kg. for male guinea pigs to 780 mg. per kg. for male rats and chicks. Direct contact with the eyes of rabbits caused moderate pain and conjunctival irritation but no lasting injury.

Skin contact studies with rabbits showed the material to cause rather severe burns if confined to the skin and that the material could be absorbed in toxic amounts if exposures were extensive and prolonged. The LD_{50}, using a modified "Draize" technique, was about 1000 mg. per kg.

Toxicity and Antidotal Studies on an Anticoagulant Rodenticide, Pival (2-Pivalyl-1, 3-indandione.) *J. R. Beauregard*, T. W. Tusing and R. F. Hanzal, Hazleton Laboratories, Falls Church, Va.

Anticoagulant properties of Pival and antidotes for Pival poisoning in dogs and secondary Pival toxicity in cats have been investigated. The acute lethal dose of pure Pival following oral administration to dogs was in the order of 75 to 100 mg. per kg. Prothrombin and coagulation times, determined prior to Pival administration and daily thereafter, reached maxima of over 540 and 7500 seconds, respectively.

In a subacute study eight dogs were each fed 2.5 mg. of Pival per kg. of body weight. Two untreated dogs served as controls. Pival administration was daily until definite toxic signs or markedly prolonged prothrombin and coagulation times developed. Pival was then withdrawn from two dogs; two were given intravenously 10 mg. per kg. of synthetic vitamin K (Synkavite); two were given intravenously 1.0 mg. per kg. of vitamin K_1 (Mephyton) and two were continued on Pival at 2.5 mg. per kg. until death. Vitamin K_1 was a more effective antidote to Pival poisoning than synthetic vitamin K.

Mice were fed Pival ad lib until death or marked hemorrhagic tendencies were noted, at which time the survivors were sacrificed. All mice were frozen and homogenized with water. Cats were given this whole mouse homogenate in portions equivalent to one 25-gram mouse per cat for 15 days. No secondary Pival toxicity was observed. All cats remained healthy during the test period and showed no significant changes in prothrombin and coagulation times.

An Organic Phosphorus Compound Highly Toxic to Insects. Arnold M. Mattson, Janet T. Spillane and *George W. Pearce*, Communicable Disease Center, Public Health Service, Savannah, Ga.

In the course of screening various organic phosphorus compounds for their vapor toxicity to house flies, a highly potent impurity was found present in one of the products. Since the toxic impurity occurred only to the extent of about 0.05 to 0.10 per cent isolation of sufficient quantities for analysis and identification proved difficult. However, enough was isolated for micro analysis. The results indicated that the impurity was closely related to the product in which it was found. Subsequent work provided a simple method of converting the mother product to a highly toxic compound evidently identical to the impurity originally found in it. Evidence based on phosphorus, chlorine, molecular weight and other analyses indicates that the potent compound is 0, 0-dimethyl-2, 2-dichloroethenolphosphonate. Its toxicity towards house flies is about equivalent to parathion but it appears to be substantially less toxic to rats when treated orally.

The potential uses of the compound, especially in fly control, are being investigated.

Acaricidal Activity of α-Substituted Benzhydrols. *H. F. Wilson* and J. S. Barker, Rohm and Haas co., Philadelphia, Pa.

A study of the acaricidal activity of a series of α-substituted benzhydrols, $Ar_2C(OH)R$, has shown a definite structure-biological activity relationship. Maximum acaricidal activity is obtained when Ar is 4-chlorophenyl, although the compounds where Ar is phenyl or 4-ethylphenyl show activity. In the series $(4\text{-}ClC_6H_4)_2C(OH)\ CH_{3-n}\ Cl_n$ acaricidal activity increases as n increases from 1 to 3. Acaricidal activity of two new and highly active compounds in this series, α-dichloromethyl-4, 4'-dichlorobenzhydrol and α-trichloromethyl-4, 4'-dichlorobenzhydrol, is discussed.

Chlorobenzilate, an Effective New Acaricide. *C. C. Alexander*, Geigy Agricultural Chemicals, Bayonne, N. J.

Chlorobenzilate, 2-hydroxy-2, 2-bis-(4-chlorophenyl) ethyl acetate, was synthesized by Haefliger in the laboratories of J. R. Geigy, S. A., Basle, Switzerland. Laboratory tests in Switzerland and United States proved it to be an effective acaricide having good residual properties.

Beginning in 1951, rather extensive field tests have been conducted in many parts of this country. Chlorobenzilate sprays containing either wettable powder or emulsion concentrate formulations were effective in controlling various species of mites on many agricultural and horticulture crops. No insecticidal properties were observed. Phytotoxic effects were noted on some species of stone fruits, particularly following early season applications.

The Schechter-Haller colorimetric method of analysis for DDT has been adapted for the determination of Chlorobenzilate. A number of analyses show that there is little residue present on food crops following practical applications for mite control.

Chlorobenzilate exhibits relatively low toxicity to warm-blooded animals. Studies indicated that when fed to dogs, Chlorobenzilate was found to be excreted within two or three days.

Estimation of 2,4-Dichlorophenoxyacetic Acid Residues in Banana Pulp. *Kenneth Morgareidge*, Herbert Hellwege and Bernard M. Blank, Food Research Laboratories, Inc., Long Island City, N. Y.

The problem of estimating 2, 4-Dichlorophenoxyacetic acid (2, 4-D) residues in foods and forage crops has not, heretofore, been the subject of extensive investigation. Recent interest in the use of this chemical growth regulator for the control of ripening in bananas has led to a need for an adequate method of analysis for 2, 4-D in the edible pulp of the fruit.

The high polysaccharide and pectin content of banana pulp renders unusu-

ally difficult the extraction of the residue under study prior to its determination by the "chromotropic acid" colorimetric method. The major innovation in the present procedure is based on the use of an active, commercial pectinase preparation for the liquefaction of the pulp in preparing it for extraction by the usual solvents.

The procedure gives consistently reproducible results with a sensitivity of the order of 0.1 p.p.m. Representative values obtained on banana pulp from fruit ripened with 2, 4-D are presented together with typical recovery experiments.

It appears possible to apply enzymatic treatment to other foods of high pectin and starch content in the determination of residues of agricultural chemicals other than 2,4-D. ◆

53-54 Potash Deliveries

NORTH AMERICAN potash deliveries for the first time passed the two million mark—a total of 2,006,364 tons K_2O during June 1953 through May 1954, according to reports from the American Potash Institute. This represents an increase of 3 per cent over 1952–53.

Deliveries by the seven leading American potash producers were well over any previous year and were recorded in 45 states, the District of Columbia, Puerto Rico, Cuba, Hawaii, Canada and a few other countries.

Domestic deliveries for agricultural purposes amounted to 1,791,474 tons K_2O, an increase of more than 3 per cent over last year. Canada received 72,348 tons K_2O, a decrease of less than 1 per cent Cuba 6,669 tons, an increase of 45 per cent; Puerto Rico, 20,853 tons, an increase of 26 per cent; Hawaii, 18,852 tons, a decrease of nearly 3 per cent and other countries, 3,681 tons, an increase of 60 per cent compared to last year.

Illinois was the leading state for deliveries, followed in order by Ohio, Indiana, Georgia and Virginia. Deliveries do not necessarily correspond to consumption in a given state.

Muriate of potash was the principal grade, comprising 93 per cent of the total agricultural potash delivered; sulfate of potash and sulfate of potash-magnesia together made up nearly 7 per cent of deliveries, while manure salts dropped to an insignificant figure, reflecting the trend toward the use of more concentrated materials.

Deliveries of potash for chemical uses amounted to 92,487 tons K_2O, a decrease of 6 per cent under 1952–53. ◆

Domestic Potash Deliveries
June, 1953 — May, 1954

(Tons of 2,000 lbs. K_2O)

Point of Delivery	Muriate 60% & 50%	Manure Salts	Sulfates	Total
Alabama	52,553.39	25.00	325.14	52,903.53
Arizona	148.00	—	418.00	566.00
Arkansas	41,816.30	158.13	155.07	42,129.50
California	7,754.88	—	6,210.80	13,965.68
Colorado	513.16	—	59.01	572.17
Connecticut	3,565.99	—	867.13	4,433.12
Delaware	7,546.93	—	42.28	7,589.21
District of Columbia	187.43	—	57.89	245.32
Florida	70,824.09	34.00	28,812.85	99,670.94
Georgia	110,160.23	72.37	7,706.18	117,938.78
Idaho	317.31	—	—	317.31
Illinois	227,394.44	10.12	746.37	228,150.93
Indiana	138,315.95	—	3,247.08	141,563.03
Iowa	43,871.27	31.34	119.99	44,022.60
Kansas	2,477.32	403.93	—	2,881.25
Kentucky	26,458.90	—	14,193.20	40.652.10
Louisiana	26,637.45	—	101.69	26,739.14
Maine	7,839.19	—	593.11	8,432.30
Maryland	68,091.95	—	3,297.57	71,389.52
Massachusetts	13,656.17	—	990.00	14,646.17
M chigan	45,647.20	—	419.67	46,066.87
Minnesota	44,528.81	—	270.26	44,799.07
Mississippi	30,035.84	—	234.54	30,270.38
Missouri	42,241.62	214.50	271.93	42,728.05
Montana	59.00	—	—	59.00
Nebraska	2,473.01	—	24.02	2,497.03
New Jersey	37,186.46	47.78	826.38	38,060.62
New Mexico	72.91	—	—	72.91
New York	29,111.29	—	893.89	30,005.18
North Carolina	72,566.34	153.71	17,919.79	90,639.84
North Dakota	2,844.97	—	—	2,844.97
Ohio	162,419.69	—	4,831.82	167,251.51
Oklahoma	3,388.61	—	—	3,388.61
Oregon	3,200.44	—	92.46	3,292.90
Pennsylvania	39,081.94	—	1,079.76	40,161.70
Rhode Island	1,471.15	—	66.01	1,537.16
South Carolina	53,838.75	153.50	3,778.98	57,771.23
South Dakota	155.14	—	—	155.14
Tennessee	57,019.71	—	5,960.09	62,979.80
Texas	33,864.11	—	222.24	34,086.35
Utah	356.47	—	170.77	527.24
Vermont	409.53	—	—	409.53
Virginia	94,980.56	—	12,059.06	107,039.62
Washington	5,706.80	—	126.90	5,833.70
West Virginia	1,211.11	—	—	1,211.11
Wisconsin	58,080.24	44.87	850.35	58,975.46
TOTAL U. S.	1,672,082.05	1,349.25	118,042.28	1,791,473.58

Pest Reports

Tomato Russet Mite Reported from Va., N.C.

The tomato russet mite, which was virtually unknown in the eastern United States until year before last, has been reported from both Virginia and North Carolina within recent weeks. The Virginia infestation was found in Arlington county and the transplants had been grown locally.

The North Carolina infestation was reported from Morganton but the transplants were evidently brought into the state. In New Jersey the mite has not been as severe this season as in 1953. The same is true in counties of Pennsylvania but control measures have been necessary.

The pest was serious in the central area of Indiana during late August and early September and caused trouble in tomato fields of several Michigan counties. Reports were also received from the California counties of San Diego, Orange and Santa Barbara.

Other truck and vegetable pests which were of importance during late August and early September included hornworms. In Arizona damaging numbers were on chili peppers at Amado. Georgia reported the heaviest infestation on foliage and small pods of pimento peppers in Pike and Spalding counties that had been observed for several years.

Hornworms were abundant on tomatoes in the Charleston, South Carolina, area and were infesting tobacco in Maryland and North Carolina. Tobacco hornworm moths were abundant in the Clarksville, Tenn., area.

In several eastern Virginia counties the two-spotted spider mite infestation on tomatoes was general and the heaviest in recent years. It was expected that the build-up would continue and controls needed on late snap and lima beans, cucumbers and peppers. Mites were reported as causing damage to watermelons in Pennsylvania and Rhode Island, to lima beans and black-eyed peas in Delaware and to eggplant in southern New Jersey.

The green peach aphid was in damaging numbers on suckers and terminal growth of tobacco in Fayette and Bourbon counties, Ky. Spotty heavy infestations were on tobacco in St. Marys county, Md. This aphid was also building up on potatoes in Rhode Island.

Other aphids reported in September included the potato aphid which was numerous on potatoes and tomatoes in New Jersey and building up on potatoes at Bath and Paw Paw, Mich. During early September populations were relatively small for the time of year at Presque Isle, Me. In New York there was a build up on tomatoes in Rockland County and on some seed lettuce field in Idaho.

Based on material received from Economic Insect Survey Station, Plant Pest Control Branch, Agricultural Research Service, USDA, supplemented with information received by FARM CHEMICALS *from Federal and state agencies.*

Mexican Bean Beetle Reported from Idaho

A small infestation of Mexican bean beetle larvae was found in a bean field approximately 2½ miles northwest of Twin Falls, Ida., during August. As far as is known this is the first report of the bean pest from Idaho. All infested bean plants and plants surrounding the infestation were pulled and burned and the field treated with insecticide. Continued survey has failed to reveal additional infestations.

The Mexican bean beetle probably came to this country from Mexico and has been known in the western part of the United States since about 1850. With this find the insect is now known to be in the west and mid-western states of Arizona, New Mexico, Colorado, Wyoming, Utah, Idaho, western Texas, western Nebraska and western South Dakota.

An isolated infestation was found in Ventura county, Calif., in 1946 but a regulatory control program was immediately initiated and for the past several years no infestations have been found.

In the eastern United States the Mexican bean beetle was first discovered in Alabama in 1920. Since then it has spread to most of the important bean-growing districts of states east of the Mississippi. Infestations have also been reported from Iowa, Missouri and Arkansas.

Other reports concerning the Mexican bean beetle received during late August and early September indicate that damage was widespread in northeastern Colorado, severe in garden beans of Laramie county, Wyo., and noticeable in several counties of Utah.

Infestation was at a low ebb in Florida, control was not required in Tennessee, lighter than normal in Massachusetts and on the increase in North Carolina, being generally light in the Piedmont area but heavy in the mountains.

Cereal & Forage Insects

Among the cereal and forage insects causing damage during late August and early September, the fall armyworm was very important. Reports of damage from this pest were from Arizona to Delaware.

In Arizona the fall armyworm was abundant on some plantings of sweet corn and sorghum in Maricopa county. Late planted corn in the central area of Kansas continued to be damaged with Texas reporting damage to grain sorghum and corn in Dimmit, Moore and Uvalde counties.

Infestations were general over Arkansas with damage severe to corn in some counties. In southern Illinois the pest was apparently on the increase with damage serious to small corn. Louisiana reported some serious infestations and although the Tennessee infestation was general it was considered light. Populations up to 125 per square foot on Argentina bahia grass were reported from Madison, Fla.

Other crops severely attacked in Florida included millet, soybeans, Coastal Bermuda and pasture grasses.

In Georgia millet, hegari, peanuts, kudzu, soybeans, Bermuda and pasture grasses were being damaged in various localities. Young corn throughout North Carolina was heavily infested as was the case in Delaware. The Maryland infestation was lighter.

The true armyworm (*Pseudaletia unipuncta*) which reached outbreak proportions during the past two years is still very active in some areas. During early September in the northern two-thirds of Missouri heavy damage to volunteer small grains, fescue and brome grass was caused by third generation larvae. Counts ranged up to 100 larvae per square foot in small grain fields. Parasitism was heavy on the larger larvae which were principally fifth instar. This species was also reappearing in many alfalfa and clover fields of western Illinois. Damage continued in Utah and Wyoming. Moths taken at light traps in Arkansas were heavy during August; in Tensas Parish, La., they exceeded the catches taken during spring flights.

The corn earworm was causing damage in many states during early September. Infestations in canning corn in Utah averaged 33 per cent and sorghum heads in the Stewart area of Arizona were damaged.

A rather severe outbreak in milo and sorghum heads occurred in Kansas with counts in some Riley county fields reaching 16 larvae per head with 40 to 50 per cent of the heads infested. Field corn in southeastern Missouri was reported to have 90 to 100 per cent infested ears and some injury to soybean pods was occurring.

Moth and egg laying activity increased steadily and was expected to continue until frost in Illinois. Moth flights in Illinois were the heaviest in many years. In the northern half of Arkansas approximately 100 per cent of the sorghum heads in many fields were attacked. Some soybean damage was also reported. At Knoxville, Tenn., large numbers of moths were being caught in light traps.

Heavy infestations were in several fields of cowpeas raised for canning and freezing in the Fort Valley, Ga., area. Sorghum in the Clinton, N. C., area was heavily infested. Massachusetts reports indicated that infestations were lighter than in 1953, and although Maine infestations were light some injury occurred in Cumberland and Hancock counties during July.

In Kansas the brown wheat mite was beginning to hatch in local areas of central and western counties. Although populations were light if the dry weather continues a general build-up can be expected. Light populations of eriophyid mites, those associated wheat mosaic, were found on volunteer wheat and western wheat grass in the same areas of Kansas.

Codling Moth Activity

The codling moth activity was extending into the early part of September. In Indiana injury due to third brood larvae has been extremely severe and much higher than, at least, since 1944. There are numerous orchards in southern Indiana where growers have not obtained satisfactory control, and where control was obtained it was by continuous and thorough coverage during all of August and the first week of September.

Third brood adults were extremely active from Aug. 4 to Sept. 10 with peak flights being Aug. 18-19, Aug. 24-26 and Sept. 1-2. In North Carolina mountain counties, damage was severe in uncontrolled orchards or those adjacent to nearby orchards which were neglected.

Damage was above normal in Utah orchards where controls were not carefully timed and moths were flying later than usual in some areas. In contrast to the preceding discussion, Massachusetts reports codling moth is not of as much concern as usual.

Gypsy Moth Program

The spray control program for the gypsy moth during 1954 extended into several states. Records of spraying for gypsy moth control and eradication for the fiscal year ending June 30, 1954, show that 1,371,199 acres were treated by aircraft with DDT in the New England states, New York, Pennsylvania and Michigan during May and June.

In Massachusetts alone there

Calendar

Oct. 6-7—Fifth annual conv., Pacif. N.W. Plant Food Assn., Sun Valley, Ida.
Oct. 12-15—8th National Chem. Exposition, Chicago Coliseum, Chicago, Ill.
Oct. 15—Assn. of Amer. Fert. Cont. Officials, Shoreham Hotel, Washington, D. C.
Oct. 16—Assn. of Econ. Poisons Cont. Officials, Washington, D. C.
Oct. 18-19—Fertilizer Section, National Safety Congress, Chicago, Ill.
Oct. 18-21—National Pest Control Assn. annual convention, Lido hotel, Miami Beach, Fla.
Oct. 22—Annual Arkansas Fertilizer School, Little Rock.
Oct. 25-29—American Soc. of Agronomy meeting, Minneapolis, Minn.
Oct. 26-27—Annual Wash. State College Dusting & Spraying conference, Chinook Hotel, Yakima.
Oct. 28-29—Canadian Ag. Chem. Assn. annual meeting, Seigniory Clum, Montebello, Quebec.
Nov. 3-4—Annual S. C. meeting for fert. dealers, salesmen and mfrs., Clemson, S. C.
Nov. 8-12—Amer. Society of Agronomy, St. Paul, Minn.
Nov. 9-11—16th Annual New York State Insecticide, Fungicide conference, Ithaca.
Nov. 10-12—NFA Southern convention, Hollywood Beach hotel, Hollywood, Fla.
Nov. 13-14—Grassland Program, sponsored by Joint Committee on Grassland Farming and Soil Conservation Society of America, Hotel Geo. Washington, Jacksonville, Fla.
Nov. 15-16—Calif. Fert. Assn., Coronado, Calif.
Nov. 15-16—Eastern Branch, ESA, New York City.
Nov. 18—Annual Pesticide Dealers conference, New Brunswick, New Jersey.
Nov. 18-19—Fertilizer section, S. C. Annual Accident Prevention conf., Spartanburg, S. C.
Nov. 29-30—Indiana Fertilizer conf., Purdue University, Lafayette, Ind.
Nov. 29-Dec. 1—Third National Ag. Credit conference, American Bankers Assn., Hotel Peabody, Memphis, Tenn.
Nov. 29-Dec. 2—Vegetable Growers Assn. of America annual convention, Syracuse, New York.
Dec. 2-3—Beltwide Cotton Insect Control conf., Adolphus Hotel, Dallas, Tex.
Dec. 5-9—Agric'l Ammonia Inst., Jung Hotel, New Orleans.
Dec. 6-9—North Central Weed conf., Gardner Hotel, Fargo, N. D.
Dec. 6-9—ESA annual meeting, Houston, Tex.
Dec. 7—Exec. committee meeting, Fertilizer section, NSC, Board of Directors' Room, Spencer Chem. Co., Memphis, Tenn.
Jan. 9-12—Middle States Garden Supply Show, Hotel Sherman, Chicago.
Jan. 31-Feb. 3—Eastern States Garden Supply Show, 71st Infantry Regiment Armory, New York City.

were 977,181 acres sprayed under contract arranged by the Massachusetts Department of Natural Resources.

In Connecticut nearly 162,000 acres were treated by Federal and state governments.

In Michigan 86,400 acres were sprayed by aircraft from June 6 to 10 inclusive. This spraying was conducted to eradicate a gypsy moth infestation discovered near Lansing May 19, 1954. In addition to the aerial spraying, slightly more than 29,800 acres were treated with mist blowers, making a grand total of more than 1,401,000 acres sprayed by the Federal Government and state cooperators for gypsy moth control and eradication in 1954. ◆

1953-54 Usage Shows Gain in Wisconsin

Sales of fertilizer in Wisconsin during the fertilizer year 1953–54 increased 4.5 per cent over 1952–53, according to a report from the State Department of Agriculture. The following comparative table has been prepared by W. B. Griem:

	1952-53			1953-54		
	Fall	Spring	Total	Fall	Spring	Total
Complete Mixed Goods	43,741	253,087	296,828	51,839	267,917	319,756
Phos. & Potash Mixtures	24,486	54,758	79,244	24,130	57,498	81,628
Superphosphates	1,054	1,664	2,718	1,119	1,594	2,713
Other Materials	11,487	27,080	38,567	8,979	23,376	32,355
Total Tonnage	80,768	336,589	417,357	86,067	350,385	436,452

Super Production Drops

Production of superphosphate in June amounted to 165,969 short tons (100 per cent APA) according to the Bureau of the Census, a decrease of 9 per cent from the May 1954 output and 2 per cent less than that reported for the corresponding month of 1953.

Shipments of all grades of superphosphate totaled 73,944 tons for June, or a decrease of 24 per cent from the previous month's volume and a 15 per cent decrease from June 1953.

Stocks on hand at the end of June were 24 per cent greater than those held on June 1, 1954, and 10 per cent more than the quantities on hand as of June 30, 1953.

Calif. Fert. Sales

A report from the California Bureau of Chemistry shows that of the 299,195 tons of fertilizers sold during the 2nd quarter ended June 30, 77,978 tons were dry mixed fertilizers, 62,673 tons were ammonium sulfate and 45,534 tons were ammonia solution (20–0–0). Fertilizer grades leading the list in sales were 17–7–0—9,305 tons; 10–10–5—8,994 tons and 8–8–4—5,254 tons.

S. C. Fertilizer Tonnage

A report from Bruce Cloaninger, head, Department of Fertilizer Inspection and Analysis, shows tonnage for August, compiled from invoices submitted by registrants to be as follows: Mixed fertilizer—7,049; nitrogenous materials—2,491; phosphatic materials—1,280; potassic materials—155; miscellaneous—58; grand total—11,033.

Potash Deliveries Up

Potash deliveries during the first six months of 1954 in North America by seven major American potash producers and imports for the first five months amounted to 1,918,377 tons of salts containing an equivalent of 1,126,101 tons K_2O, according to a report from the American Potash Institute. This represented an increase of 8 per cent in salts and 9 per cent in K_2O over the same period in 1953.

Deliveries of potash for agricultural use in Institute countries totaled 1,841,148 tons of salts with an equivalent of 1,078,322 tons of K_2O, an increase of 9 per cent in salts and 11 per cent in K_2O over last year.

Production - June, 1954

Compiled from government sources

Chemical	Unit	June 1954	June 1953	May 1954
Ammonia, synth. anhydrous	s. tons	[1]216,786	185,194	249,837
Ammonia liquor, coal & coke—(NH_3 content)	pounds	3,240,433	4,097,500	3,713,747
Ammonium nitrate, fert. grade (100% NH_4NO_3)	s. tons	116,189	96,786	129,904
Ammonium sulfate				
synthetic (technical)	s. tons	58,439	38,557	75,910
coke oven by-product	pounds	130,250,708	158,675,800	132,412,571
BHC (Hexachlorocyclohexane)	pounds	7,738,483	5,113,561	9,265,656
Gamma content	pounds	1,250,870	741,414	1,459,527
Copper Sulfate (gross)	s. tons	5,564	———	6,116
DDT	pounds	9,401,444	8,242,396	9,574,147
2,4-D Acid	pounds	3,058,983	2,587,769	3,087,898
esters & salts	pounds	2,412,404	2,283,136	2,243,165
esters & salts (acid equiv.)	pounds	1,828,497	1,768,917	1,749,045
Lead Arsenate (acid & basic)	s. tons	323	822	1,055
Phosphoric acid (50% H_3PO_4)	s. tons	240,342	198,325	*263,086
Sulfur, Native (Frasch)	l. tons	455,174	419,365	465,360
Recovered	l. tons	30,500	30,077	31,000
Sulfuric acid, gross (100% H_2SO_4)	s. tons	1,128,858	1,163,791	*1,178,073
Chamber process (100% H_2SO_4)	s. tons	202,102	227,936	*214,570
Contact process (100% H_2SO_4)	s. tons	926,756	935,855	963,503
Superphosphate (100% APA)	s. tons	198,809	190,574	185,090
Normal & Enriched (100% APA)	s. tons	123,347	129,713	139,760
Concentrated (100% APA)	s. tons	42,466	38,187	42,509
Wet Base (100% APA)	s. tons	156	764	368
2,4,5-T Acid	pounds	209,435	464,057	———

* Revised. [1] Includes quantities for one plant previously not reporting.

FERTILIZER MATERIALS MARKET

New York

September 11, 1954

Sulfate of Ammonia. Because of the recent low rate of steel production and also the fact that some sizeable orders have been placed by the Government for export to the Far East, production and demand are more in balance and no surplus is reported.

Nitrate of Soda. Stocks are being maintained at various ports and demand is fair with no price changes noted.

Ammonium Nitrate: Demand for ammonium nitrate has fallen off recently and some material was reported to have been stored in expectation of better demand in the next 60 days.

Urea. Demand for this material has slackened somewhat over the last 30 days with the current market for imported material quoted at $117 to $120 per ton at the ports. Domestic producers are able to make quick shipment.

Nitrogenous Tankage. One producer recently increased the price to $3.75 per unit of ammonia ($4.56 per unit N), f.o.b. production point. Some producers are now sold out for the next six months and offerings are limited for both prompt and future shipment.

Castor Pomace. No offerings are being made, with last sales at $27 per ton, f.o.b. production points. Because of the small production, a possible shortage is looked for during the coming season.

Organics. Organic fertilizer materials maintained a firm tone in price and offerings of certain types were rather scarce. Tankage sold at $7.50 per unit of ammonia ($9.12 per unit N), f.o.b. Eastern points with demand limited. Blood sold at $8 per unit of ammonia ($9.72 per unit N), f.o.b. New York and offerings were scarce. Soybean meal was available for shipment October forward at $62 per ton in bulk, f.o.b. Decatur, Ill., with spot commanding a premium of about $10 per ton. Linseed meal and cottonseed meal were firm in price.

Fish Meal. Because of recent unseasonably rough weather, fishing along the East Coast has been poor and some plants report shipments running behind contract commitments. Last sales of fish meal 60 per cent were made at $127 per ton, f.o.b. fish factories. Demand has been limited to buyers' immediate needs

Bone Meal. This material has maintained a firm tone for the last 30 days from both the fertilizer and feed trade with last sales made at $60 per ton, f.o.b. shipping points. No offerings were reported of raw bone meal.

Hoof Meal. Last sales were made at $6.75 per unit of ammonia ($9.20 per unit N), f.o.b. Chicago, and market was said to be well sold up. Demand is coming mostly from industrial users.

Superphosphate. This market is rather a routine affair at this time. Stocks are ample to take care of buyers' needs and no price changes reported. With several new plants now in production, triple superphosphate is now available for prompt shipment.

Potash. In most cases, domestic potash producers report shipments are running a little behind last year but they expect a better movement later this month.

Philadelphia

September 10, 1954

There is a slight upward trend in the fertilizer materials market and deliveries against contracts have increased. Nitrogenous tankage and castor pomace are presently in somewhat short supply. Sulfate of ammonia production is down but the supply is still equal to the demand. Anhydrous ammonia and nitrate of ammonia are now plentiful. Superphosphate is keeping up with requirements and potash movement is satisfactorily normal.

Sulfate of Ammonia. While coke-oven production has been reduced, there is no shortage of this material. Synthetic grade is reported sold out for several months ahead. Market is steady with no price change reported.

Nitrate of Ammonia. There is now no scarcity of this material. Production this year is considerably ahead of last.

Nitrate of Soda. This continues in ample supply with movement seasonally normal. No price changes are noted.

Blood, Tankage, Bone. Both blood and tankage are in stronger position than last reported. The former is quoted at $8.25 per unit of ammonia ($10.02 per unit N), here in the East, and $8.50 ($10.33 per unit N), Chicago area, with tankage $7.75 ($9.42 per unit N), here and $8.25 ($10.02 per unit N) in the West. Bone meal demand has improved somewhat and is quoted at $60 to $62 per ton. Hoof meal is quiet at $6.75 per unit of ammonia ($8.20 per unit N), Chicago.

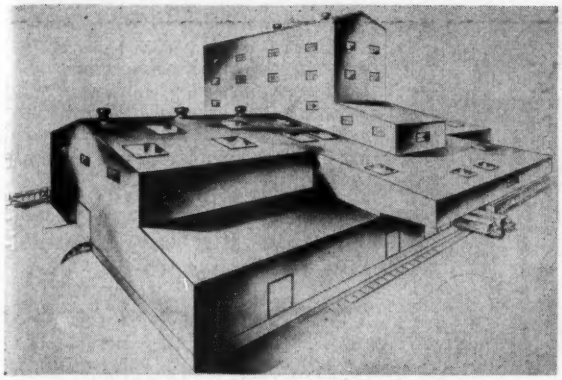
Castor Pomace. There are no offerings at this time as production is reported sold ahead for several months.

Fish Scrap. This remains at $125 per ton for scrap and $130 per ton for menhaden meal, with the market rather quiet.

Phosphate Rock. While this is seasonally rather quiet, it is expected the demand will pick up with the approach of the fall mixing season.

Superphosphate. The supply position of triple grade has improved and no serious shortage is evident. Stocks of normal grade are amply sufficient to meet requirements and movement will be accelerated as full mixing operations get under way. No price changes are indicated.

Potash. Deliveries against contracts have improved considerably and production is being maintained in anticipation of later requirements.



Artist's conception of Farm Bureau Cooperative Association's new fertilizer manufacturing plant to be constructed at Mt. Gilead O. by A. J. Sackett & Sons.

Newest Farm Bureau Plant

THREE main factors prompted Farm Bureau Cooperative Association's decision to expand its fertilizer manufacturing facilities through construction of a $750,000 granulated fertilizer plant near Mt. Gilead, O.

1. Continued high consumer demand for fertilizers with the tonnage to be delivered in shorter shipping periods;

2. Constantly increasing demand for high analysis fertilizers which will retain free flowing drillability even when subjected to extended periods of bagged shortage and

3. A continuing effort on the part of the association to place fertilizer facilities in closer proximity to the members, thereby improving service and lowering distribution costs.

Construction & Design by Sackett

Construction of the plant, which along with design has been assigned to A. J. Sackett co., has already begun, with full production scheduled for July, 1955.

According to Robert A. Garn, manager of the bureau's Fertilizer Manufacturing div., "The new plant will incorporate granulation, drying and cooling for the production of a granular or pelleted product rather than the pulverized material now making up 90 per cent of the fertilizer sold in the Ohio area. The plant will use the granular processing method developed by TVA."

The bureau's plant sites have been selected to minimize the distribution problem, with plants located in the west (Dayton), southwest (Glendale), northwest (Maumee), northeast (Alliance), southeast (Marietta) and the new Mt. Gilead plant in the north central part of the state. ◆

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editorial

Merger Rumors

RUMORS are a commonplace part of Washington life; however, some recent speculations at the Nation's capitol have the industry mighty interested. There has been a great deal of comment concerning a possible merger of the American Plant Food Council and the National Fertilizer Association. To date nothing definite has been released for publication on such a combination.

Some sources report that there has been considerable discussion of the subject although there are a few who express personal doubt that such a merger will take place at the present time.

A year or so ago NFA considered a change in name to eliminate "Fertilizer" from its title, substituting "Plant Food." This was voted down at that time through a survey of the association's members but a new survey was supposedly made during the current year.

We recall that Louis Ware, president of International Minerals and Chem. corp. and immediate past president of NFA, digressed from his prepared speech at White Sulphur Springs this summer to again present his views on the proposed change of name. He suggested that "Plant Food" be considered in a new title as a phrase more attractive to the public than "Fertilizer" and one that would better represent the true nature of the industry.

Whether the proposed change in title was a forerunner of merger considerations can only be answered by the inner circles and, of course, definite information on the merger itself can only come from the same groups. However, it will be quite a surprise should the aims and personalities of the two groups be successfully reconciled and combined into one plant food trade organization.

A New Association

WE CAN'T drop the subject of trade associations without calling to your attention another bit of news that became known a few weeks ago—the formation of the new American Superphosphate Institute, Inc.

In the past, the nitrogen industry has had a more or less open field for tossing around the public relations football without the assistance of any P_2O_5 quarterbacks. Now it looks like phosphorus will join the other two major plant food elements in receiving much needed publicizing as ASI, under the leadership of its president, Howard Doerr, established policies designed to "develop, encourage, increase and extend the utilization of superphosphate in the interest and aid of agriculture."

Officers of the superphosphate trade group, in addition to Doerr, include Frank R. Dulany, vice president and Charles Ellis, Jr., secretary.

Fall Application Drive

IN LATE August, C. J. Chapman and associates initiated a drive for autumn application of fertilizer, a campaign that should help to demonstrate the effect of some concentrated selling on the problem of extending the application season.

Fertilizer manufacturers were asked to make use of three mimeo leaflets—one on fall fertilizer usage on old alfalfa, grass pastures and timothy-brome grass fields, another on topdressing pastures with 10–10–10 and a third on the extended crop production horizons that have resulted from increased nitrogen application.

Chapman suggested that manufacturers mimeo the leaflets for distribution to their dealers, prepare statements based on the material for distribution by their dealers and use the information to develop short stories for local rural newspaper advertising.

Backing up the direct promotional material, Chapman scheduled a large number of radio talks and arranged to appear on at least one TV show, the latter reaching an estimated 60,000 farm families. The Soils dept. of the University of Wisc. prepared exhibits for use at the state farm show and at the national corn picking contest and had quite a number of articles scheduled for publication in national and regional magazines.

Advertising is mentioned several times by Chapman, both radio and TV spots and local newspaper pieces. One excellent suggestion made is that manufacturers urge their dealers to tie local advertising into the TV programs and other promotional efforts by calling attention to such events in their ads. Such efforts will aid in increasing the effectiveness of both approaches, simplifying the job of breaking down farm resistance.

It is difficult to estimate how successful such a promotional program can be; however, the development of fall application is dependent on cooperation by the fertilizer manufacturer, the state land grant college and the agricultural extension service. At least two of the essentials were present in the Wisconsin drive; we hope that the industry provided sufficient support to aid in demonstrating that farmers will buy fall fertilizer.

It will be interesting to learn the results of this program, an effort that, if successful, may be worthy of duplication in all sections of the country.

G. P. T., JR.
Managing Editor

FREE INFORMATION to help you solve fertilizer, pesticide problems

Reader Service

292—Pelleted Urea 45

A product data bulletin is available from Nitrogen div. on the new Arcadian urea 45 pelleted fertilizer. The material can be applied in many ways including foliar spray use and in conjunction with pesticides. The booklet provides full information on this material including experimental research data, application rates and properties. For a copy

CIRCLE 292 ON SERVICE CARD

293—Aldrin-Fert. Mixes

Get set for the aldrin-fertilizer mix demand, suggests Shell Chemical, pointing to successes of these products during the past year. This should be of special interest to those in the corn belt for the mixtures have done an excellent job of controlling the corn rootworm. For specifications and complete details

CIRCLE 293 ON SERVICE CARD

294—New Spreader Gadget

Highway Equipment has added a new metering attachment for use with the New Leader fertilizer and lime spreader. The device is said to eliminate much of the guesswork involved in fertilizer application, enabling the operator to determine proper feedgate opening for any given output per acre without wastage. For details

CIRCLE 294 ON SERVICE CARD

295—Amnical

Ashcraft-Wilkinson is now offering Italian made Amnical, an ammonium nitrate limestone containing 20.5 per cent nitrogen. Half of the N is in nitrate form with the remainder as ammonia. The product also contains about 40 per cent calcium carbonate with magnesium carbonate. If interested in this newly available material

CIRCLE 295 ON SERVICE CARD

296—Cyanogas G Fumigant

Up to 30,000 bushels per hour of stored grain can be treated at an average rate as low as one-fourth cent per bushel with Cyanogas G Fumigant from American Cyanamid. Kills approach 100 per cent and even eggs in grain berries are killed. It handles automatically by gravity with no weighing, mixing or measuring and no injurious effect on milling or baking qualities when used as directed. Literature is available

CIRCLE 296 ON SERVICE CARD

297—Worthington Ammoniator

A one page bulletin on a new continuous ammoniator has been issued by Worthington corp. The unit provides more efficient ammoniation without loss of volatile gases, and was developed as a result of TVA experiments. Indexed operating parts are illustrated by a line drawing on the bulletin.

CIRCLE 297 ON SERVICE CARD

298—Crag Repellent Data

Crag Fly Repellent produced by Carbide & Carbon Chem. repels all types of flies and acts as a synergist for pyrethrin and allethrin. The material is compatible with most toxicants and stabilizes pyrethrins. It can be used in a variety of formulations and is safe for application on dairy or beef stock. For technical information

CIRCLE 298 ON SERVICE CARD

How to use the READER SERVICE CARD

- **Circle number of literature you want.**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

299—New NH_3 Brochure

Growth of the NH_3 industry in agriculture is reviewed in a colorful brochure from Bastian-Blessing. The booklet, in question and answer form, presents the arguments for NH_3 use and describes distribution and application methods. A single copy can be obtained by those seriously interested in this field.

CIRCLE 299 ON SERVICE CARD

300—Heptachlor & Skeeters

Velsicol corp. has released a new folder describing the use of heptachlor in mosquito control. It provides data for larva and adult control for abatement projects and urban areas with a rate of application table and suggested methods of use. For a copy

CIRCLE 300 ON SERVICE CARD

301—ET Bagpacker

One operator can tape and sew 15 bags per minute on the model ET Bagpacker from International Paper. Adjustable for bags from 25 to 100 lbs. capacity the castor mounted unit can be easily moved to widely separated stations. A booklet is available with complete details and dimensional drawings.

CIRCLE 301 ON SERVICE CARD

302—Strobane for Household Use

Technical Strobane is available from B. F. Goodrich for use in liquid and aerosol sprays. Only a low concentration is required to kill household pests with strobane, a material that has been extensively tested for toxicity, requires no secondary aromatic solvents and which will not deteriorate in storage. Formulations leave no visible crystalline residue, have excellent stability and the toxicant is easy to formulate. For technical information and samples

CIRCLE 302 ON SERVICE CARD

303—The Baughman Line

A new catalog has been issued by Baughman Mfg. which fully describes its line of fertilizer and lime spreaders. Data is included for belt and chain discharge models, a split drive spreader and orchard and grove body and a mud body. For a copy

CIRCLE 303 ON SERVICE CARD

304—Pivalyn Baits

Pivalyn, the anti-coagulant water-soluble rodenticide produced by Motomco, is available to formulators in bulk or in 1½ oz. packets under their own label. The material has been proven effective under a wide range of conditions throughout the country and the company offers an excellent profit margin at all marketing levels. For full details, formulators can

CIRCLE 304 ON SERVICE CARD

305—Personnel Materials

Science Research Associates has released a catalog of personnel materials for business and industrial use, a volume listing materials they claim will be helpful in selecting better employees, increasing employee performance, choosing employees for promotion and reducing turnover. Available to personnel, industrial relations and management executives.

CIRCLE 305 ON SERVICE CARD

306—The Agrimul System

The Agrimul system of emulsifiers for handling all pesticide formulations is described in a brochure from Nopco Chemical. Providing formulas for all purposes, it describes how one group of emulsifiers fills all needs, permitting lower inventories, simple ordering and faster deliveries.

CIRCLE 306 ON SERVICE CARD

307—Molybdenum Chemicals

Climax Molybdenum, a company that has been pushing the use of "moly" as a trace element additive, has issued a four page bulletin on moly products for the chemical industry. It briefly describes the base metal and various ore and chemical products now on the market and is intended as a guide to the selection of these materials.

CIRCLE 307 ON SERVICE CARD

308—Surfactant Aid

Antara surfactants in insecticides and herbicides are reviewed in a new publication from Antara Chemicals. Included are typical starting formulations for preparation of emulsifiable concentrates or wettable powder forms which should be of assistance as a guide to the formulator.

CIRCLE 308 ON SERVICE CARD

309—All-Vision Respirator

Safety plus comfort and convenience are provided in Mine Safety Appliance's "All-Vision" chemical cartridge respirator. It permits better vision and more freedom of movement while providing protection in areas containing light concentrations of organic vapors, acid gases and ammonia. For a bulletin

CIRCLE 309 ON SERVICE CARD

310—Thanite Data

Hercules Powder's Thanite insecticide is reviewed in a new publication of 24 pages covering formulations, test data, packaging and other information. The toxicant can be used in many formulations including those for household, livestock, fabric, mosquito and veterinary products. To obtain a copy, formulators interested in this toxicant can

CIRCLE 310 ON SERVICE CARD

311—Lessman Loader

A new Lessman loader is now being produced, the model GFT with front wheel drive and rear wheel steering. A patented power crowd feature permits filling of bucket without forward movement of tractor, and the unit offers full reverse in any speed range from two to 20 mph. Bucket capacity: 22 cu. ft. struck; 28 heaped. For information

CIRCLE 311 ON SERVICE CARD

312—Organo-Mercury Comps.

First in the field with organo-mercury compounds for agriculture, Gallowhur Chemical now offers literature on o-m cadmium materials for seed treatments. To obtain this information

CIRCLE 312 ON SERVICE CARD

How to use the
READER SERVICE CARD

- **Circle number of literature you want.**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

313—Remote Weight Control

Richardson Scale has issued information on a new remote weight control system for continuously and accurately blending additives with process material. Features include batch weighing of additives, continuous weighing of process material and remote selection of weight ratios using a single dial control.

CIRCLE 313 ON SERVICE CARD

314—Aratron for Mites

A folder is available describing use of Aratron from American Potash & Chem. in controlling spider mites on crops. An aramite product, two formulations are available—25 per cent wettable powder or emulsifiable solution. For a copy

CIRCLE 314 ON SERVICE CARD

315—Inventa Urea Process

Vulcan Engineering is now offering the Inventa process for urea production, a method commercially proven in over five years of tonnage production. Features include lowest investment and operating costs for a once-through synthesis plant; high ammonia conversion; off-gas suitable for direct use in making nitric acid, etc.; a system for recovery and recycle of all or any part of the ammonia; elimination of reactor corrosion. If your company is interested in urea production, you can get more details.

CIRCLE 315 ON SERVICE CARD

316—Test Controls

The Bristol co. has developed a complete line of control instruments for use with environmental test cabinets. These can be used to simulate any desired temperature, humidity or altitude condition with accuracy of control set at one-half per cent of full scale value. Available in one or two case models. For further information

CIRCLE 316 ON SERVICE CARD

317—Beaucolloy Chain

A two page catalog sheet describes the Beaumont Birch No. DT-132B Dura-Tred Beaucolloy steel combination chain, adaptable for use on all types of bucket elevators or conveyors handling bulk materials. Included are construction features and information on operation and application. The Dura-Tred feature provides 340 per cent more metal on the wearing tread of the link.

CIRCLE 317 ON SERVICE CARD

318—Double Diffusion

"How to Treat Fence Posts by Double Diffusion," a USDA Forest Service booklet is being offered by Mutual Chemical. The method involves sodium chromate (a Mutual product) and copper sulfate and requires very little equipment. For a copy of the booklet

CIRCLE 318 ON SERVICE CARD

319—Swiveloaders

The Stephens-Adamson Mfg. line of fixed and portable Swiveloader is reviewed in a new bulletin. The centrifugal thrower units are designed for handling bulk materials and include a new model designed to load over grain doors of box cars at capacities up to 150 tons per hour.

CIRCLE 319 ON SERVICE CARD

320—High-Speed Scale

Details are available on a high-speed, low-platform sacking scale produced by Exact Weight Scale. The unit speeds manual sacking or checkweighing through a short lever fall, adjustable damping device and magnified indication. Of open construction, the scale has a tower set at a 30 degree angle which can be revolved to any reading position, and also has a weighing platform only 6½ inches from the floor.

CIRCLE 320 ON SERVICE CARD

321—Grinding Insecticides

Any size specifications for insecticides are possible with the Micronizer grinding machine according to Sturtevant Mill. Engineered to operate at high production speeds, the unit is quickly cleaned on changes of formulation and is simple to operate and install. Available as machine alone or in a complete production unit. For complete data

CIRCLE 321 ON SERVICE CARD

Buyers' Guide

Classified Index to Advertisers in 'Farm Chemicals'

ALDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

AMMONIA—Anhydrous and Liquor

Commercial Solvents Corporation, New York City
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Lion Oil Co., El Dorado, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIA APPLICATORS

KBH Corp., Clarksdale, Miss.

AMMONIUM NITRATE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM PHOSPHATE

Monsanto Chem. Co., St. Louis, Mo.

AMMONIUM SULFATE

See Sulfate of Ammonia

AMMONIUM SULFATE NITRATE

Baker & Bro., H. J., New York City

BAGS—Multiwall-Paper

Chase Bag Co., Chicago
International Paper Co., Bagpak Div., N. Y. C.
Hammond Bag & Paper Co., Wellsburg, W. Va.
Hudson Pulp & Paper Corp., N. Y. C.
Kraft Bag Corporation, New York City
Union Bag & Paper Corp., New York City

BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES

International Paper Co., Bagpak Div., N. Y. C.

BAG PRINTING MACHINES

Schmutz Mfg., Louisville, Ky.

BAG FILLING MACHINES

Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

BHC AND LINDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.,
Diamond Alkali Co., Newark, N. J.
Pennsylvannja Salt Mfg. Co., of Wash., Tacoma, Wash.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div. Pittsburgh, Pa.

BONE PRODUCTS

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID

Woodward & Dickerson, Inc., Philadelphia, Pa.

BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—Hoist, Crane, etc.

Hayward Company, The, New York City

CALCIUM ARSENATE

American Agricultural Chemical Co., N. Y. C.

CARS AND CART

Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

CASTOR POMACE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
McIver & Son, Alex. M., Charleston, S. C.

CHEMISTS AND ASSAYERS

Shuey & Co., Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CHLORDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

CLAY

Ashcraft-Wilkinson Co., Atlanta, Ga.

CONDITIONERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

CONVEYORS

Power-Curve Conveyor Co., Denver, Colo.
Link-Belt Co., Chicago, Ill.

COPPER SULFATE

Republic Chem cal Corp., New York City
Tennessee Corp., Atlanta, Ga.

COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa

CUSTOM PESTICIDE FORMULATION

Barco Chemicals, Inc., Des Moines, Ia.

DDT

Ashcraft-Wilkinson Co., Atlanta, Ga.
Diamond Alkali Co., Newark, N. J.
Michigan Chemical Corp., St. Louis, Mich.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

DIELDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

DILUENTS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Calcium Carbonate Co., Chicago, Ill.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh. Pa.
Summit Mining Corporation, Carlisle, Pa.
Thomas Alabama Kaolin Co., Baltimore, Md.

DITHIOCARBAMATES

Berkshire Chemicals, New York City

ELEVATORS

Power-Curve Conveyor Co., Denver, Colo.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.

ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City
Fairlie, Inc., Andrew M., New York City
General Industrial Development Corp., N. Y. C.
Marietta Concrete Corporation, Marietta, Ohio
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation, Nicolay, New York City

FERTILIZER—Mixed

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.

FILLERS

Bradley & Baker, N. Y. C.

FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH

Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES

American Agricultural Chemical Co., N. Y. C.
Berkshire Chemicals, New York City
Pittsburgh Coke & Chemical Co., Agr. Chem. Div. Pittsburgh, Pa.
Republic Chemical Corp., New York City
Tennessee Corp., Atlanta, Ga.

HERBICIDES

Diamond Alkali Co., Newark, N. J.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div. Pittsburgh, Pa.

HERBICIDES—Oils

Lion Oil Company, El Dorado, Ark.

HOPPERS & SPOUTS

Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind,

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Berkshire Chemicals, New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES

American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
Diamond Alkali Co., Newark, N. J.
Fairfield Chem. Div., Food Mach. & Chem. Corp., New York City
Michigan Chemical Corp., St. Louis, Mich.
Pennsylvanna Salt Mfg. Co., of Wash, Tacoma, Wash.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div. Pittsburgh, Pa.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.
U. S. Industrial Chemicals Co., New York City

IRON SULFATE

Tennessee Corp., Atlanta, Ga.

KAOLIN

Thomas Alabama Kaolin Co., Baltimore, Md.

LEAD ARSENATE

American Agricultural Chemical Co., N. Y. C.

LIMESTONE

American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
National Lime & Stone Co., Findlay, Ohio

Buyers' Guide

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Acidulating
Chemical Construction Corp., New York City

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Nutri-Sol Chemical Co., Tampa, Fla.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Clark Equipt. Co., Construction Mach. Div., Benton Harbor, Mich.
Hayward Company, The, New York City
Hough, The Frank G. Co., Libertyville, Ill.
Lessman Mfg. Co., Des Moines, Ia.
Link-Belt Co., Chicago, Ill.
Poulsen Co., Los Angeles, Calif.
Power-Curve Conveyor Co., Denver, Colo.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Nutri-Sol Chemical Co., Tampa, Fla.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Power Transmission
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY
Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.

MAGNESIUM SULFATE
Berkshire Chemicals, New York City

MANGANESE SULFATE
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, Washington, D. C.

MINOR ELEMENTS
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

NITRATE OF POTASH
Berkshire Chemicals, New York City

NITRATE OF SODA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
McIver & Son, Alex. M., Charleston, S. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
Commercial Solvents Corporation, New York City
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

NITROGEN MATERIALS—Organic
American Agricultual Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Smith Rowland Co., Norfolk, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

PARATHION
Ashcraft-Wilkinson Co., Atlanta, Ga.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

PENTACHLOROPHENOL
Monsanto Chemical Co., St. Louis, Mo.

PHOSPHATE ROCK
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID
American Agricultural Chemical Co., N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.

PLANT CONSTRUCTION—Fertilizer and Acid
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
General Industrial Development Corp., N. Y. C.
Link-Belt Co., Chicago, Ill.
Monsanto Chemical Co., St. Louis, Mo.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation Nicolay, New York City

POTASH—Muriate
American Potash & Chemical Corp., N. Y. C.
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, Washington, D. C.
Southwest Potash Corporation, New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate
American Potash & Chemical Corp., N. Y. C.
Baker & Bro., H. J., New York City
International Min. & Chem. Corp., Chicago, Ill.
Potash Co. of America, Washington, D. C.

POTASSIUM PHOSPHATE
Monsanto Chemical Co., St. Louis, Mo.

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

REPAIR PARTS AND CASTINGS
Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

SCALES—Including Automatic Baggers
Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

SCREENS
Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

STORAGE BUILDINGS
Butler Manufacturing Co., Kansas City, Mo.
Marietta Concrete Corporation, Marietta, Ohio

SULFATE OF AMMONIA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TANKS—NH3
Birmingham Tank Co., Birmingham, Ala.

TEPP
Monsanto Chemical Co., St. Louis, Mo.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr., Chem. Div., Pittsburgh, Pa.

2, 4-D
Diamond Alkali Co., Newark, N. J.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem Div., Pittsburgh, Pa.

2, 4, 5-T
Diamond Alkali Co., Newark, N. J.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

UREA & UREA PRODUCTS
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.

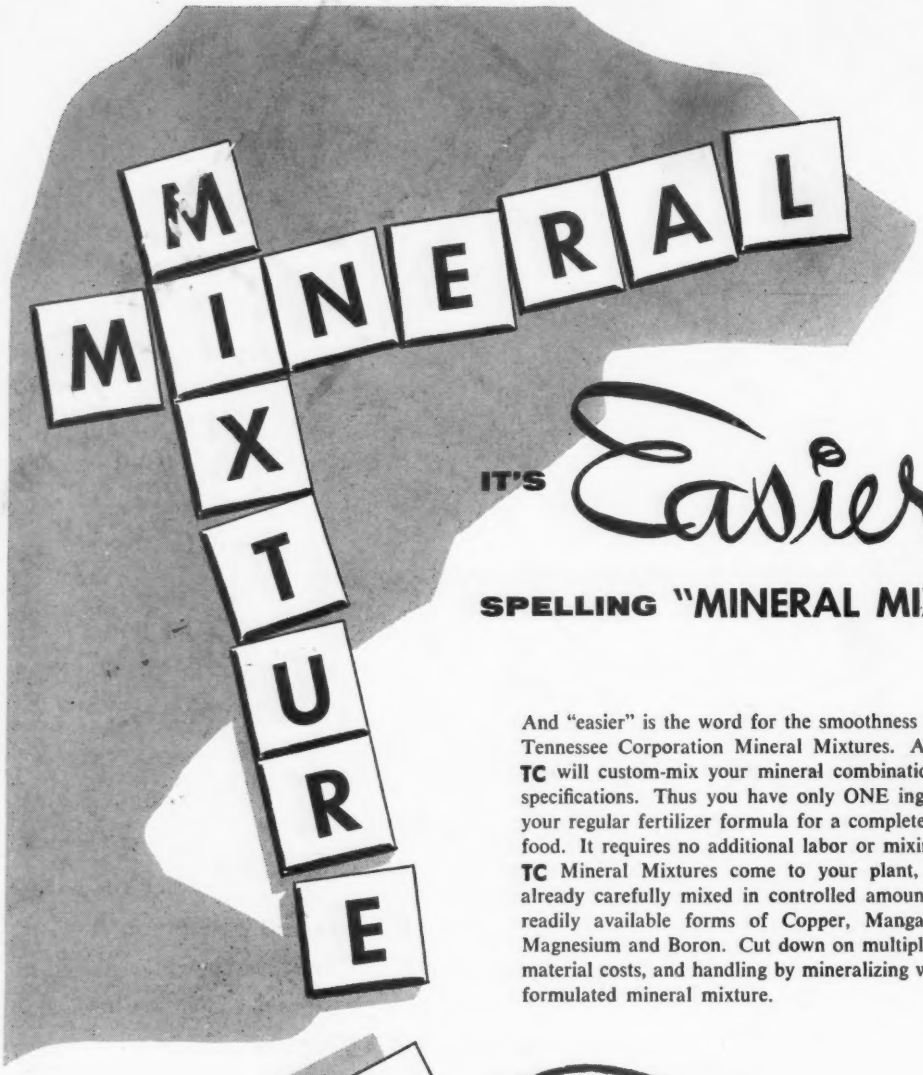
Success

The farmer, like other good businessmen, prepares for his new crop starting at the bottom. After plowing and cultivating, he uses abundant fertilizer and quality seed. He knows that his success starts from what's underneath.

After all, digging wells is about the only business where you can begin on top.

POTASH COMPANY of AMERICA
Carlsbad, New Mexico

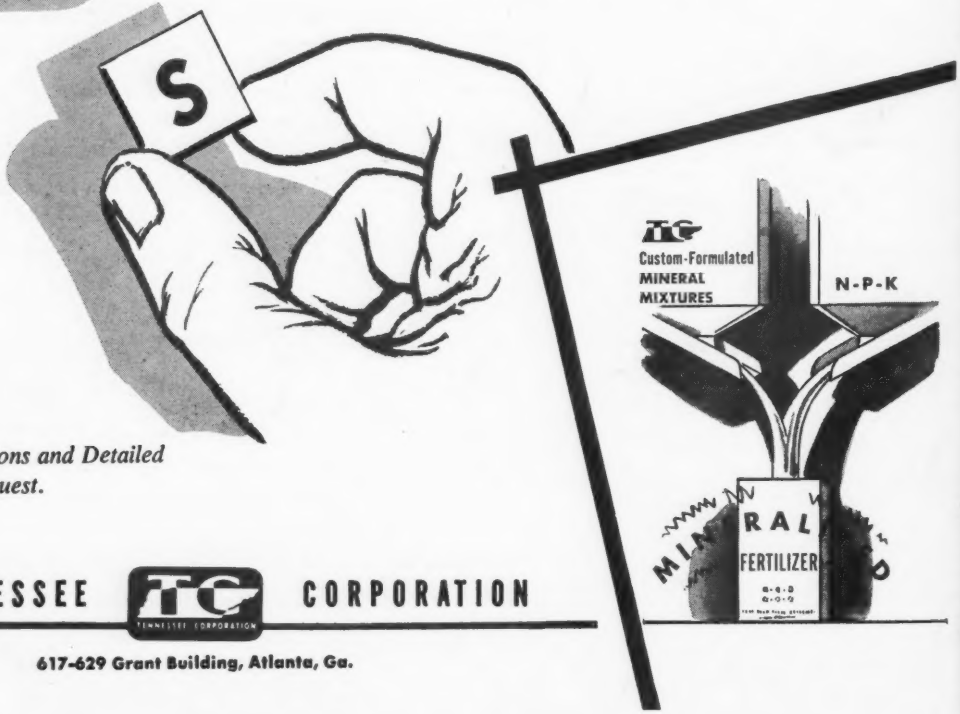
General Sales Office....1625 Eye Street, N.W., Washington, D. C.
Midwestern Sales Office....First National Bank Bldg., Peoria, Ill.
Southern Sales Office....Candler Building, Atlanta, Ga.



IT'S *Easier* THAN

SPELLING "MINERAL MIXTURES"!

And "easier" is the word for the smoothness of operation with Tennessee Corporation Mineral Mixtures. And easiest of **all**, **TC** will custom-mix your mineral combination to any desired specifications. Thus you have only ONE ingredient to add to your regular fertilizer formula for a completely balanced plant food. It requires no additional labor or mixing facilities, since **TC** Mineral Mixtures come to your plant, in bulk or bag, already carefully mixed in controlled amounts of soluble and readily available forms of Copper, Manganese, Iron, Zinc, Magnesium and Boron. Cut down on multiple purchasing, raw material costs, and handling by mineralizing with a **TC** custom-formulated mineral mixture.



Samples, Specifications and Detailed Information on Request.

TENNESSEE TC CORPORATION

617-629 Grant Building, Atlanta, Ga.